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OS/2 FOR CORPORATE AMERICA  
FEBRUARY 1994, VOLUME II, NUMBER 2

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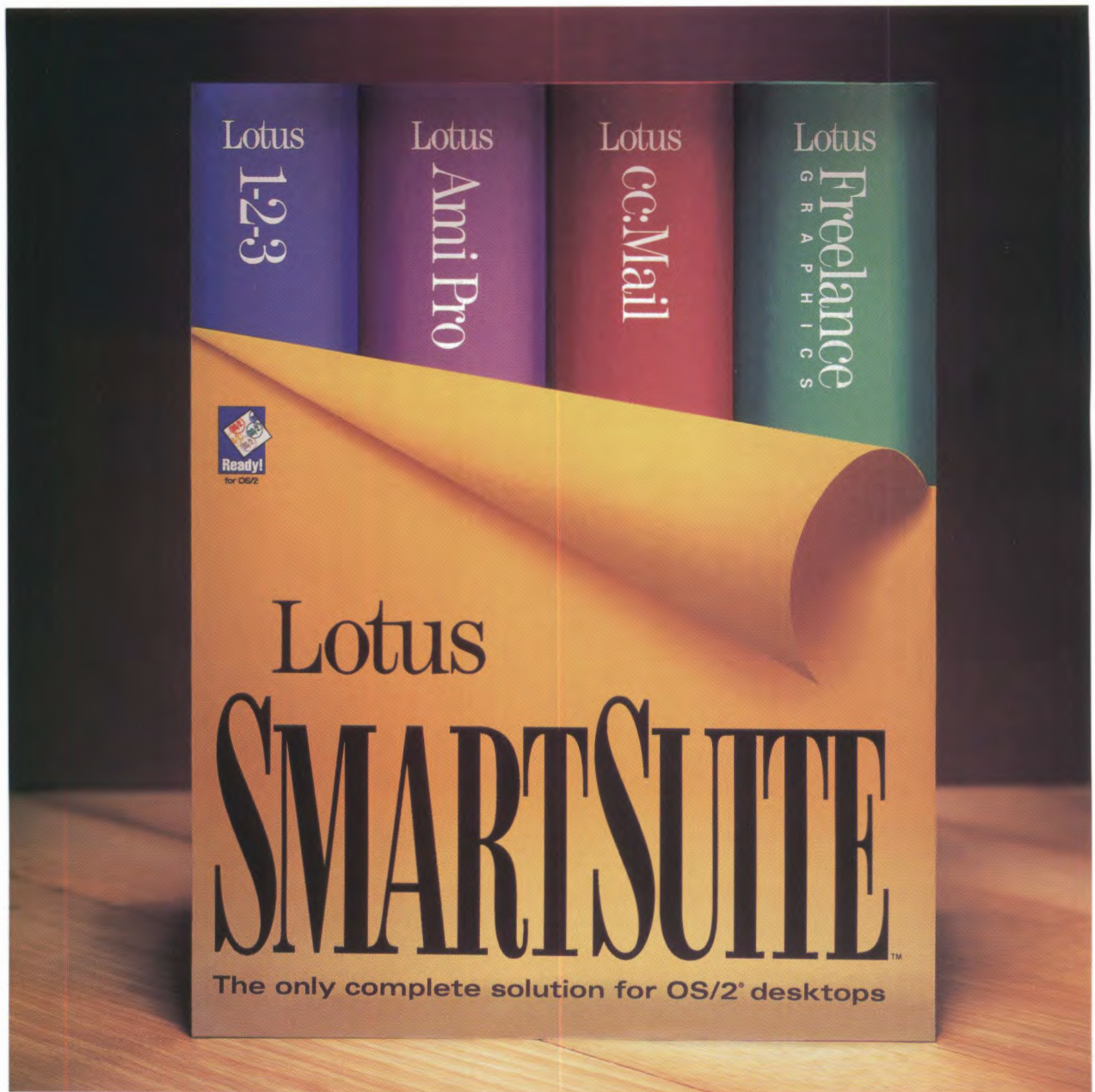


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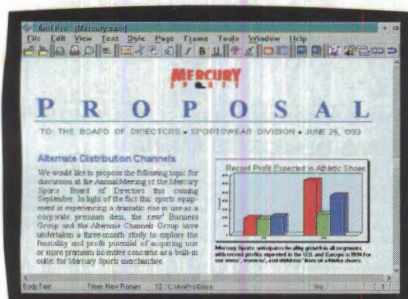


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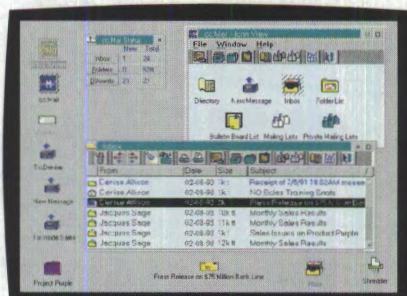
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If you use the OS/2 environment, have we got some disaster recovery solutions for you!

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BY ANNE G. LONGSWORTH



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THE MAGAZINE FOR OS/2 PROFESSIONALS

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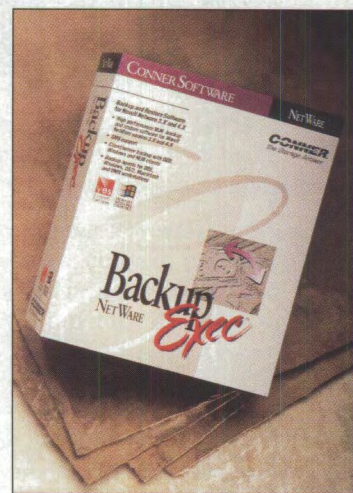
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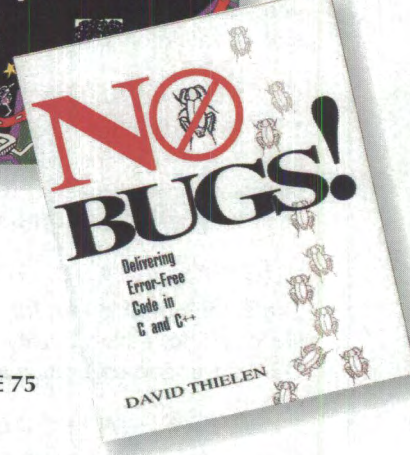
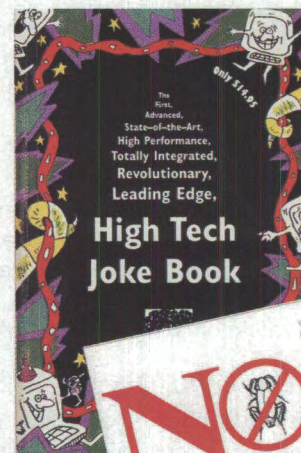
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NEW FIBER OPTIC

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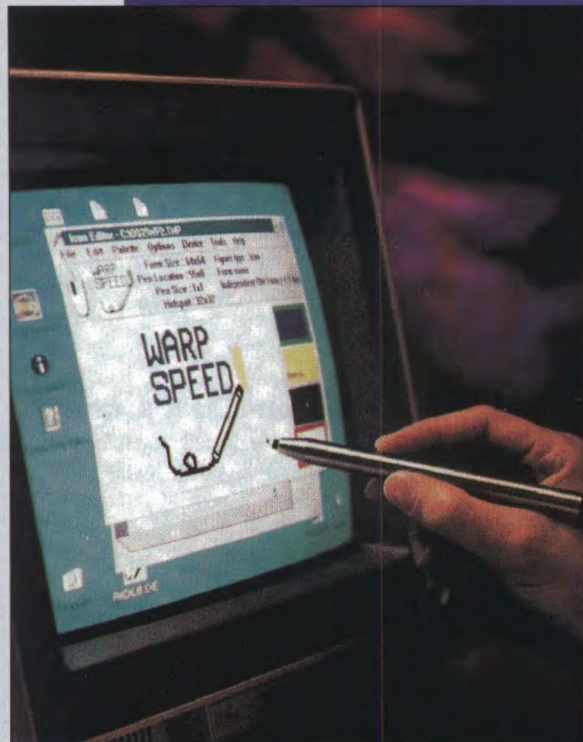
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# The Economics of OS/2

**O**S/2 is now a clear success—but it is hardly a success story. In its wake is an economic shambles.

The first victim of the chaos was Big Blue itself. No one knows how much money IBM lost on OS/2—some Wall Street analysts suggest upwards of a billion dollars.

Ironically, I seriously doubt OS/2 would be thriving today if Louis Gerstner had taken his job just a few months earlier. He would have said, "This is too stupid, guys." But by the time he ascended in April 1993, the momentum was set for the first three quarters and then Microsoft's NT bogeyman vanished. OS/2 was put over the top. Now, IBM hopes to see an installed base by year's end of close to nine million worldwide, mostly corporate. By Q3, IBM should be on its way to genuine penetration of the retail market.

Ironically, the whole OS/2 applications marketplace is in reality a house of diskettes balanced precariously upon the shifting resources of IBM. Indeed, during a forthcoming interview with Borland CEO Phillippe Kahn we asked the question: Can any independent vendor make money on an OS/2 application without that money coming from IBM in one way or another?

His reluctant response was first "Tough question," and then a long, complex explanation of why there ain't no money in OS/2 unless it comes from IBM.

Readers will remember last spring when a slew of ISVs went broke, were forced to sell out, or halted development waiting for a repeatedly delayed 2.1 to release and a nonexistent coop program to materialize. That phenomenon is continuing. As every insider knows, the growth curve for OS/2 apps is far less steep than the growth curve for OS/2 itself. Economic dependency on IBM directly or indirectly is a fact of life for everyone in the OS/2 marketplace—including OS/2 publications.

Developers are still suffering angina. I hear stories from leading vendors hanging in there from day to day trying to avoid bankruptcy. Periodically, IBM bails out some of the most desperate

with a check for an advance purchase of thousands of copies. When that occurs, IBM's financial picture becomes that much weaker, and if the ISV survives, it is not because of sales but rather the result of IBM's manipulation of its controlled market.

The whole thing has extraordinary potential for uncertainty and for abuse. How can IBM build the OS/2 marketplace by helping DeScribe or WordPerfect when it has a vested interest in the Lotus SmartSuite? How can it help Sytron or MSR when it has its own back-up product, Safe and Sound, to promote? Perhaps that is why, to the best of my knowledge, there is currently no

major new independent application on the order of a WordPerfect or a Paradox under development. It all depends on IBM and what it is willing to spend.

Until the market straightens itself out by virtue of sheer growth—which might be at the end of this year, depending on how Chicago hits the ground—OS/2 users and developers, and even OS/2 publications, will continue to be at the mercy of the financial whims of IBM. This unhappy state of affairs may correct itself when the installed base has enough economic muscle to determine its own

market realities. Is that nine million users? Is it 12 million users? Who knows? Moreover, vendors will not be encouraged to test OS/2 if they suffer backlashes such as that endured by WordPerfect when it pulled WordPerfect 6.0 for OS/2. Who wants to risk a user hate campaign from a community that won't allow a company to back out when it cannot justify continued market testing? By the same token, there will never be a level playing field so long as IBM's deals and promises become the underlying currency in every OS/2 decision.

Don't delude yourself. The free market won't even begin to reach OS/2 for at least a year. Until then, corporate OS/2 can only continue to view itself as a pioneer on the cutting edge in both technology and economics. ♦

*Edwin Black*







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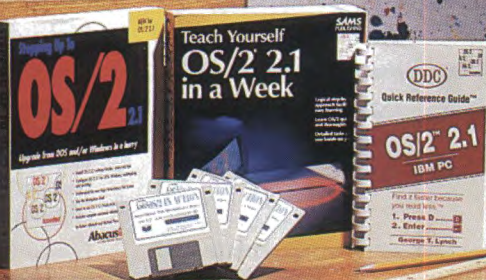
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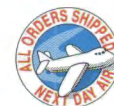
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*Comments, criticisms, and observations*

## Fight the advertisers

Congrats on a great beginning. Your stories of the threats of big advertiser muscle remind me of some similar discussions on the OS/2 forum of CIS a few months back with folks from Ziff-Davis. Some OS/2 users were saying they thought there was an anti-OS/2 bias in the mags; no matter what Microsoft promised, it was reported as a fact. The publishers said no there was no pro-Windows bias: how could there be? Easily, we said, who pays for the big, multi-page ads?

As you said, as the ad income grows, it may get more difficult to resist—for a bigger or a lesser magazine. Please resist the pressure. I'll happily pay for *OS/2 Professional*. Just don't send it in a plastic bag!

**Lee Hammond**  
via MCI Mail

## Publishing independence

Congratulations on making it through your first year! I have enjoyed watching your publication grow, and I value its existence. Keep up the good job!

Edwin Black's comments in the November Publisher's Memo stimulated the following thoughts:

As a confirmed "twidget" (techno-junkie), I have at times followed the literature on audio equipment, electronics, and photography with some fervor. Ziff-Davis (ZD), CCW, and others have all built tremendous empires by catering to each respective industry. With all the money they rake in from advertising (a relatively small proportion of their income is from subscribers), none have been able to justify the maintenance of a "quality" publication.

Perhaps the most obvious example is the demise of ZD's *PC-Tech Journal* which was justified on the basis of inadequate circulation (read this to mean that the advertisers that paid for the magazine refused to buy space because the circulation was too small). ZD tried to wean the PC "intelligentsia" that read *PCTJ* by converting the remaining subscriptions to *PC Magazine*. They staunchly maintained that the main

contributors would continue to produce *PCTJ* "within the covers" of *PC Magazine*, a promise that lasted four issues.

Many computer professionals have become completely disillusioned with the computer press, and we no longer feel that integrity in reporting comes before the bottom line. There are indications that a certain number of important industry journalists share this sentiment. Perhaps it was this sort of disillusionment that motivated Will Zachmann to make his incredibly brave break with ZD last year. It certainly elevated him highly in my opinion.

Perhaps if we actively support *OS/2 Professional*, we can make it the "Audioophile" of computer magazines, primarily responsible to its readers, not to its advertisers. See Edwin Black's comments in the November issue. Can we reinforce his desire to do just what he is saying? I hope we can. We should learn to evaluate this magazine (and all technical journals) as we read them.

**Dr. John Spitznagel**  
Memphis, Tennessee

## OS/2 benefits

For months now I've been hearing and reading about Windows NT, and each time I read a review, the product has changed its dimensions, yet it's always better than OS/2. The latest kicker was a letter I read explaining how someone has decided he/she is tired of trying to install OS/2 because of the system requirements, so he/she has decided to install NT instead. Huh? Talk about system requirements.

Please don't look at this as "NT Bashing." I just feel some of the items that seemingly place NT above OS/2 in these reviews merit a closer look. So, what of the built-in capabilities of NT?

OS/2 doesn't run on multiprocessor machines yet, but how many people actually have these beasts? These machines are expensive and unnecessary for the vast majority of applications. By the time these monster computers are widely available and more in line with most budgets, OS/2 may well have the

same capabilities—maybe even by the time you read this. Multiprocessor versions of OS/2, both asymmetric and symmetric, have already been shown.

OS/2 doesn't have built-in security, but what good is that on a PC or a workstation anyway? Anyone with a little knowledge of PCs has merely to pop the case off a machine to get to drives or boards and make away with what they "need." Mainframe shops keep their boxes behind locked doors for just that reason. Besides, add-on security is available if it's important to you.

OS/2 doesn't include networking capabilities, but many would rather use their own NOS anyway. I have yet to read a review for a Microsoft LAN system that would make me rush out to buy it. Indeed, in the Oct. 26, 1993, "Network Edition" of *PC Magazine*, LAN Manager was soundly beaten by OS/2 LAN Server, and even the much ballyhooed NT Advanced Server was beaten in the benchmarks by LAN Server. The winner of these comparisons was actually NetWare 3.11, the choice of many companies and which my PC uses, running Requester for OS/2, on a token ring. With OS/2, I have that choice.

OS/2 does not run on RISC machines. No argument there, but many microcomputer users prefer the nasty old CISC machines, and with Pentiums and the upcoming multiprocessor machines, that RISC may become less important. In the near future, the Workplace Shell, under the Mach kernel, will become available for RISC machines as well, for those with the need.

It is misleading for NT to advertise that it will run OS/2 software. While you and I may realize that it will run only 1.x applications, many prospective buyers may not. IBM made a mistake in insinuating OS/2 2.0 would run Windows applications when it failed to run most 3.1 versions. True, it actually said Windows 3.0, but I have heard many complaints from those who felt they were misled. Microsoft would

*continued on page 70*



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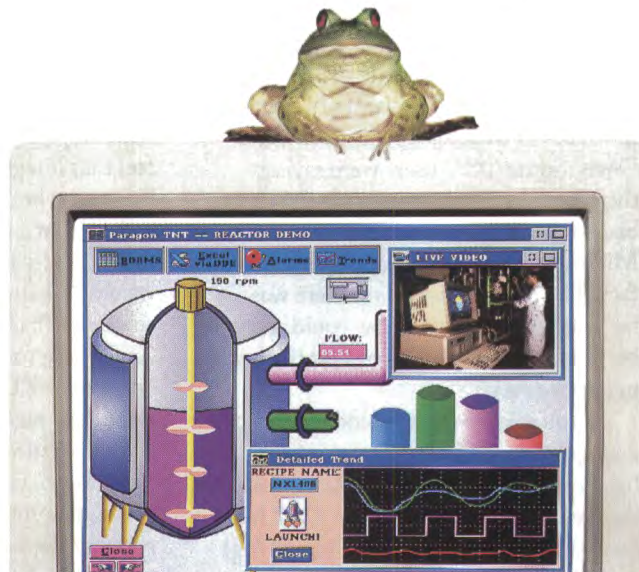
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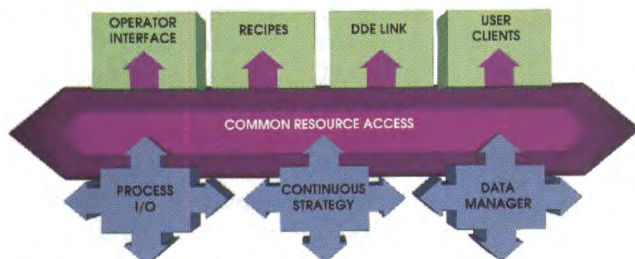


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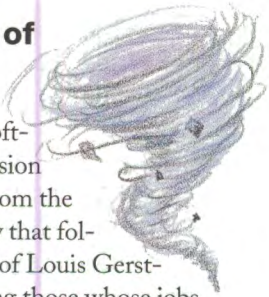




# BYTES & PIECES

News and trivialities, important and obscure

## A whirlwind of changes at PSP



IBM's Personal Software Products division is hardly exempt from the personnel volatility that followed in the wake of Louis Gerstner's arrival. Among those whose jobs have changed are Jim Cannavino, John Patrick, Bill Rich, and Dan Lautenbach. Now two key contributors to the OS/2 bandwagon, John Osborne and John Soyring, have new business cards as well.

Osborne, one of PSP's brightest marketers, has been transferred to IBM's Marketing & Services division. Since Osborne, as PSP's director of sales, made OS/2 successful in the retail channels, his transfer spotlights the continued ascendancy of Marketing & Services, a separate division within IBM, in the OS/2 game plan.

Along with Osborne goes a significant chunk of the sales force, as well as 800-line telephone ordering operations such as "The Software Store."

Soyring, PSP's director of software development and another of OS/2's most popular figures, is now director of strategic relations. In his new job, Soyring will become the official worldwide liaison with OEMs, consultants, publishers, and vendors. He also will serve as OS/2's spokesman and as a contact point for the news media.

Despite his new role, which is likely to move him farther away from the OS/2 development efforts ongoing at Boca Raton, Soyring vows to stay in touch with the developer community. "I love development. I'm really a technomerd at heart," he declared.

Dave Harrington, formerly manager of strategy and plans, will step into Soyring's old development job.

## Boca at work on WOS GUIs

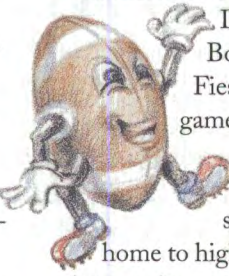
Work is proceeding at IBM's Boca Raton lab to ensure that the Workplace

OS, IBM's multi-personality, object-oriented operating system, will support multiple GUIs.

Users will be able to choose their GUI when they opt to function under a given operating system personality, a development source explained. OS/2 users, for example, could select the OS/2 personality. Then, when they load a Unix program, the normal Unix controls will appear, "but everything else will appear as though it were OS/2," the developer noted. The same would apply for those selecting NT, AIX, or one of the other personalities.

The multiple GUI capability will impact performance, the source said, but IBM is expecting to compensate for it using, among other things, the speed inherent in the PowerPC, by redesigning the semaphores that control protected access to system requirements, and by a retooling of the guts of OS/2.

## Fiesta Bowl touchdown



IBM appears to have scored a touchdown with the seven 15-second OS/2 television ads aired during the late December "IBM Fiesta Bowl." Unlike the first Fiesta Bowl foray, this year's game featured a series of slick, people-oriented advertisements aimed at a spectrum of users, from home to high-end corporate. Preliminary ratings gave the game an 8 rating, meaning that more than 7.2 million households tuned in, marketing sources say.

The hallmark of the ad series was the absence of technical jargon. Terms such as multitasking were dumped in favor of references to everyday activities such as faxing, printing, writing a letter, and running a spreadsheet all at the same time. Indeed, the most technical term used in the ads was "drag and drop." The recurring catch phrase Lintas used to promote OS/2 was simple but effective: "Put OS/2 in your PC and get


more out of your PC."

The spots, created by Lintas:New York, were first tested before focus groups. Members of the groups made suggestions about content and effectiveness that in several cases were adopted and tweaked into the final version of the ads.

## Flying toasters, at last!

Many OS/2 partisans are fanatics, defending it to the virtual death as robust, 32-bit, multitasking, and non-Microsoft. But there's always been a dirty little secret: deep in their multi-threaded hearts, they have always been jealous of Windows' ability to run AfterDark screen savers.

It got even worse after Berkeley Systems released the *Star Trek* collection.



Some hard-core OS/2 users were even reported sneaking off to colleagues' offices for a hit of Mr. Spock and the tribbles, not to mention Bones' diagnostic records.

Well, closet toaster freaks, rest easy at last. Now all your favorite screen images can decorate your many OS/2 screens! BocaSoft, Inc. has developed a new module that allows AfterDark images to run on its WipeOut screen saver. And the best part is that the module is available free of charge in the BocaSoft Library on CompuServe. You also can get it for a \$5 shipping and handling charge through Indelible Blue.

The big question surrounding this development is how sharply the productivity that OS/2 users have prided themselves on for so long will fall off as converts spend hours reacquainting themselves with all of their favorite images?

## OS/2 peer networking

IBM is moving closer to commercial production of a peer networking version of OS/2. The product, now in beta testing, reportedly includes applications



## BYTES & PIECES

that enable peer networking through the existing NTS/2 layers (the technology used in LAN Server).

A peer networking product will give IBM an entry into a growing market currently dominated by Microsoft's Windows for Workgroups and Artisoft's LANtastic, which in a nod to its reportedly sluggish sales is referred to within IBM as "Windows for Warehouses."

If IBM delivers peer-to-peer connectivity in 1994, it will have satisfied two key demands of the marketplace. The other key demand was for an OS that could handle symmetric multiprocessors. SMP support under OS/2 will be provided by an OS/2 product currently in beta testing (see Eye on the Market, page 47).

### Market share up

IBM has increased its market share in

the worldwide personal computer field for the first time in four years, according to a survey done by Dataquest. The preliminary study shows that IBM led the way in 1993 with 13.6 percent of the PC market. While Big Blue has consistently maintained the lead in recent years, its share had fallen from 17.9 percent in 1989 to 13.1 percent in 1992.

### Howard Stern hot on OS/2

IBM is looking to disk jockey and best-selling author Howard Stern for help in increasing OS/2's market acceptance. Stern's involvement started last November when he told his listeners, "I'm trying out a new computer system in the OS/2 IBM format." Stern received a trial copy of the system from some IBMers in the New York area who heard he was interested in a good multimedia system.

On Dec. 2, Stern marveled on-air, "God, what the thing can do, the OS/2 system!" He went on, "It's too cool. It's awesome."

Stern appears to be especially impressed with OS/2's multimedia capabilities and with its multitasking. And he's not quite finished offering his opinion. The shock jock will "have something more to say about it," says publicist Don Buchwald, "because I know he's talked to our computer people here."

If Stern has more to say, IBM is happy to help. Big Blue plans to assist Stern by sending him the information and materials he needs to continue exploring OS/2, according to media relations officials. So stay tuned! ♦



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Circle #176



# OS/2's Window...of Opportunity

If Microsoft keeps to the schedule it was promising last fall, this month should be about the time when Redmond's newest champion in the battle against OS/2 takes to the field.

The promised Chicago "February beta" ought to provide a wider range of users the opportunity to see just how much *there* is there in Microsoft's latest would-be "OS/2 Killer."

The most recent bearer of that mantle was, of course, Windows NT. Widely touted by the trade press, at least initially, as Microsoft's successor to Win3.1 on the desktop, NT proved to be overweight for the job. Its voracious appetite for resources, particularly memory, ensured that it simply would not run on all but a very few desktop systems. That left Microsoft—for the time being, at any rate—with little option other than to try to menace Unix on servers rather than to drive OS/2 off desktops.

It also left OS/2 to plod on like the tortoise in Aesop's fable, steadily gaining ground, industry awards, and users' desktops (as well as servers).

The shrink wrap had barely cooled down on the first shipments of NT last August, however, before the Drums of Redmond began to beat to announce the new champion of "Windows Everywhere": Chicago. "NT was never meant to be a desktop operating system anyway," they intoned. "Windows 4.0 is the real successor to Windows 3.x, and is the soon-to-be-slayer of OS/2!"

The trade weeklies dutifully reported in mid-September on the Wonder That Was To Be Chicago. Those reports were based on peeks at the "Windows 4.0" August alpha code that just happened to get into the hands of most of the weeklies at approximately the same time. Microsoft, of course, dutifully expressed outrage and horror that anyone had been so vile as to violate non-disclosure agreements, while basking in the warmth of the gushing accounts of Chicago in the trade weeklies.

According to these initial reports, Windows 4.0 would, just like

NT, provide a true 32-bit, fully preemptive, dynamically scheduled, multitasking, multithreaded operating system with robust support for Win32 applications. Moreover, unlike NT, Chicago would provide virtually 100 percent backward compatibility for existing DOS and Windows applications. More than that, it would also provide a fantastic new "object-oriented" graphical user interface. It would have radical Microsoft-inspired innovations like the use of the right mouse button for pop-up menus. Oh! I almost forgot: It would also do all this in a mere four megabytes of memory.

The only problem with this rosy picture was the Chicago August alpha itself. I had a chance to take a good look at a copy of the same "Preliminary Release—August 1993" version of Chicago that all the trade weeklies reported on. Unlike them, however, I did not have the benefit of apparent guidance from Microsoft on what I was supposed to find.

What I found was quite a bit different from what I'd expected to find based on the reports. Instead of the robust, Intel-specific "NT Lite" that was described there, I found what appeared to be a hot-rodded version of Windows 3.1 with Win-

dows for Workgroups 3.11 features included. That is to say, instead of having an NT-like kernel and an NT-like architectural foundation, the Chicago alpha I saw appeared to be built on essentially the same foundation as Windows and Windows for Workgroups. In fact, it far more closely resembled what is described in Matt Pietrek's excellent little book, *Windows Internals* (Addison Wesley, 1993) and Andy Schulman et al.'s *Undocumented Windows* (Addison Wesley, 1992), both about the architecture of Windows 3.1, than it did Helen Custers' *Inside Windows NT* (Microsoft Press, 1993).

If, therefore, what I saw in the August 1993 alpha of Chicago is similar to what we will get in the final shipping version of Windows 4.0, and all indications—including the more recent Decem-







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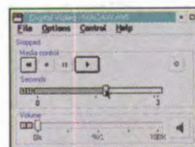


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## ZACHMANN'S VIEW

ber alpha version—support that, then the reality may prove to be very different from the picture portrayed in the glowing accounts in the trade press last fall. If the final product rests on the architectural foundation of Windows 3.1, then its ability to run Win32 applications well is likely to fall far short of what is necessary to make it a viable platform for multithreaded Win32 apps.

That is important. Microsoft promised, first to a relatively small circle of independent software vendors in December 1990 and then more publicly at the Microsoft Systems Seminar in January 1991, that it would deliver a robust, high-volume operating system platform that would run multithreaded Win32 applications.

That promise remains unfulfilled today. Windows NT was supposed to do the job, but it didn't. It is robust enough, but its resource requirements ensure that it has no chance to become a high-volume platform until the installed base of hardware catches up with those requirements at some time in the future.

Since NT has failed to meet that need, it's now up to Chicago to do the job. It can deliver if it is as robust as NT and really runs multithreaded Win32 applications as well as NT does. To do that, however, it almost certainly needs an NT-like multithreaded architecture as its foundation. It needs, in other words, to be a sort of "NT Lite," an Intel-architecture-specific version of NT with lower resource requirements.

If, however, the final product, like last year's August alpha, is going to be based on the foundation of an architecture closer to that of Windows 3.1, the prospects for it providing a robust platform for Win32 applications generally, and multithreaded Win32 applications in particular, begin to look quite dim indeed.

That's why the promised February beta is so important. It should provide the first broadly available direct look at what Chicago really will be when it finally ships. If it turns out that the August '93 alpha was merely a sort of "mock-up" and that the promised February '94 beta is really the robust "NT Lite" claimed by last fall's press accounts, then OS/2 will have a serious challenger.

If however, it turns out that Chicago really will provide only the ersatz platform for Win32 apps that was apparent in the August alpha last year, then OS/2's window of opportunity will turn out to be open even wider, and to stay open even longer, than anyone expected. ♦

## Introducing...

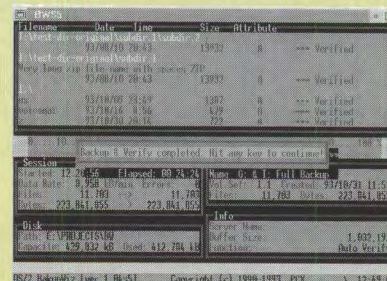
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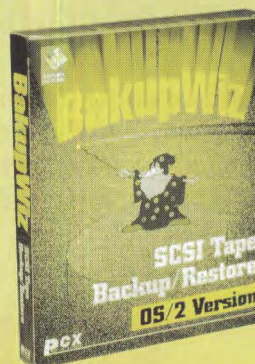
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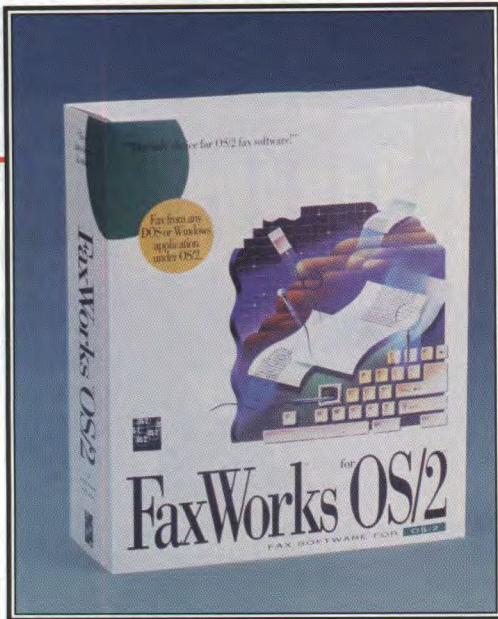
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# Q & A

*A straight-talk interview on topics of professional concern*

## DEVELOPING THE OS FUTURE *With Lois Dimpfel*



**I**n the midst of back-to-back events at the OS/2 Professional Interchange, *OS/2 Professional* Editor Brad Kliever caught up with Lois Dimpfel, director of Personal Operating Systems Software for IBM. She had just finished presenting an energetic, fast-paced production called *OS/2 Live*. An edited transcript of their conversation follows.

**Brad Kliever:** You gave a rousing demonstration of OS/2 applications, current and future, in *OS/2 Live*, which you've performed at many of these conventions. What are some of the more important current capabilities of OS/2?

**Lois Dimpfel:** The really important capabilities actually don't show in a lot of these demos. OS/2 gives you a stable, industrial

strength operating system that lets you do a number of things at the same time—you can run your client/server applications and your line-of-business applications. Most of our customers are demanding a stable environment for these applications, one in which you can work on the desktop while simultaneously communicating with a server or accessing data backup through a host. So there are things that don't show in live demonstrations.

**Some other things that don't show in live demonstrations are device drivers. What are your plans for new device drivers? We saw S3 [high-resolution video] demos—when will these 16.7 million color drivers be available?**

That should actually ship long before this article sees print. You know that we were relatively weak in our device driver department when we put out 2.0. Version 2.1 enhanced the video device drivers and added many more printers. We've actually restructured the development organization in Boca to give a focus on device drivers. As a result, we combined efforts between our own developers, who write device drivers, and the team that works with outside hardware vendors. This test organization can take device drivers from outside or build them internally, test them, put them up on bulletin boards, and make them available as they become ready. So there is now a much stronger focus on ensuring that we have the broadest set of device drivers to fit the customers' needs.

**When you say "put these on bulletin boards," do you encourage the distribution of OS/2 files, drivers and the like, via outside, non-IBM bulletin boards?**

CompuServe is a very big vehicle for us to distribute through.

**What about local bulletin boards?**

There are several smaller bulletin boards that we distribute through, like Peter Norloff's bulletin board in Virginia, which is reachable at 703/385-4325.

**Do you encourage other bulletin board operators to copy these drivers to their bulletin boards for access?**

Absolutely. We've also, I think you know, established the Developer Connection program as a pro-active channel for shipping new device drivers, as well as beta software and generally available software. Quarterly, we send out a CD-ROM that has all the updates on it, so the developers get it on a regular basis. It's another



## Q & A

er way for us to get everything out to the customers as fast as possible, especially the programmers.

### **Do you run this through the Independent Developer Assistance Program?**

No, it's actually a special program, the Developer Connection. The Developer Assistance Program that PSP Director of Software Development John Soyering runs has a subset of that information that is provided free of charge. The Developer Connection is broader and we provide programmers with a lot more beta software, tools, and that sort of thing.

### **What types of beta software are you providing?**

Well, on the last Developer Connection I think we had not only OS/2 but LAN Server and Comm Manager as well. I think we had previously provided database software in beta form, so we include the whole range of software that IBM provides for an OS/2 environment.

### **You've also demonstrated pen-aware applications and voice applications. When do you see these coming into the OS/2 market?**

Oh, interesting—I wish I had a crystal ball. Pen has not taken off as fast as the marketplace thought it would. I think you know that we had an arrangement with Go Corporation to provide the Penpoint operating system on the first tablets that came out. We first structured that relationship about two years ago and it was the hottest thing on the market at the time. But pen has just now begun to evolve to the point where hardware vendors put pen-enabled hardware in the marketplace. It's just now starting to catch on in specific line-of-business applications. And we're working with several so that they can write specific applications to specific hardware.

Technology's curve has a knee in it. Multimedia, for example, has hit the knee of the curve and it's picking up. Speech is still restricted because of technology. Pen doesn't have the technology restrictions anymore—the hardware is affordable, the software is available, and the handwriting recognition is getting better and better. Pen is just not quite there yet. You saw on the stage that block handwriting recognition is very good now—it's more than 95 percent recognition.

### **Are you only planning to use block recognition, or will you do something more like the Newton?**

Yes, we actually are working on providing unstructured, actual handwriting recognition, but that technology is a little bit further behind the block. It's getting there, and in another year or two it will be state of the art and very usable. Speech recognition, on the other hand, is not as far along as handwriting recognition. So what you saw on stage was the ability for the two different kinds of tech-

nologies, both continuous and discrete. They have value in their own applications, but they are still very limited. What everybody really wants is to walk up and use continuous speech without training the system. It's probably another two or three years before the technology really is what it needs to be.

### **So you think the technology for voice recognition will probably follow that same initial pattern of slow growth.**

Absolutely, absolutely. Every technology that you introduce follows that curve. All of the new technologies take more powerful processors, too. I was running on 486s in my presentation tonight. In order to handle much speech recognition you need at least a 486. The PowerPC and floating point technology have the advantage of additional processing power. And the new evolving systems that you are going to see will provide even better capabilities for things like speech recognition on the system.

### **When we talk about PowerPC, one of the obvious questions that comes up is Workplace OS. What do you see as the future of Workplace OS, especially in terms of release dates?**

Workplace OS is based on a set of IBM enhancements to the Mach kernel that came from Carnegie Mellon University. Personalities sit on top of that microkernel. So you can run a Unix personality to run Unix applications, or you can run DOS and Windows, or you can run OS/2. Furthermore, you can run all of those personalities at the same time.

What we'll do when we introduce Workplace OS is to release it in stages. The first stage for the OS/2 personality will be targeted specifically at the PowerPC. Its first set of introductions are going to be very human-centric focused, so you'll see an OS/2 personality with pen and speech and all those enabling technologies.

We have started delivery of the microkernel itself. The microkernel is interesting to a number of people even without a personality because it's used as the basis for other operating environments or applications that really are operating systems in their own right.

### **Could Apple's Macintosh be a personality running on top of Workplace OS?**

Well Apple is actually working more towards using a Taligent personality on the microkernel. I don't know specifically about Macintosh's systems so I don't know what they're doing with that.

### **There's also some overlap between the microkernel for Workplace OS and what we hear about the future Taligent operating system. What would you say are some of the distinguishing features between those two?**

The real distinguishing feature about Taligent is that it is fully object-optimized. What you will see evolve from our relationship with Taligent is that we will take some of the application-enabling



## Q & A

layers for object technology and we'll deliver that on OS/2. But Taligent is the promise of fully object-optimized technology down through all of the base system functions.

Now, Taligent will run on the IBM microkernel, so it can run just as another personality in this Workplace OS environment. But it brings you all the power of full object optimization so that all of your system's services are object-optimized, all your system's extensions will be object-optimized and that's a full Taligent environment.

### **Will this extend to the device drivers as well?**

Yes, it will. In fact we're actually working with Taligent so that when we implement the device drivers in the microkernel-based Workplace OS we will use an object device driver model. There will be a consistent set of device drivers that you use either in a Taligent environment or a Workplace OS OS/2 personality environment. One of the frustrations that device driver builders have is that you have to keep rewriting new device drivers. So, we're trying to sort of get to endgame and make a leap with that implementation.

### **When the Workplace OS runs DOS applications will they also run under the OS/2 personality? Or will a separate DOS personality work in parallel with the OS/2 personality so that you still get the same functions you have in OS/2 itself?**

You'll get the same functions that you have in OS/2. I'm not sure what is really behind your question because what we'll do is essentially make MVDM [Multiple Virtual DOS Machines] run on top of the microkernel. But all of the presentation will be done through a presentation manager, like an OS/2 Presentation Manager, but you'll be able to run all of your DOS and Windows apps just like you can run them today in an OS/2 environment.

### **But they'll talk directly to the microkernel for better performance?**

The MVDM—the support will.

### **And then the OS/2 personality would handle such things as System Object Model and Presentation Manager?**

Right, and handle the Workplace Shell and user interface.

### **What about the future of DOS itself? Microsoft has talked about DOS 7.0 and having multithreading capabilities. Is IBM working on the same types of capabilities?**



The customers tell us that what they need to do with their DOS apps is to run some amount of multitasking because DOS users also want to run communications at the same time they're running a DOS app. So what we're looking at is actually some of the same kinds of multitasking extensions to DOS that other people have talked about doing.

A lot of people worry whether IBM really has the ability to build DOS code because we used code from Microsoft in the past. It turns out that we used to build a lot of it ourselves—we have a lot of DOS skills. But it also turns out that multitasking for DOS applications is exactly what MVDM is in OS/2.

### **So will there be some overlap of those OS/2 features and code going into DOS 7.0?**

I think what you'll see is the potential to use capability out of an OS/2 environment to satisfy DOS problems.

### **And will that include bringing some of the graphical interface from OS/2 to DOS?**

We've already told customers that we're implementing a Workplace Shell in the DOS environment. That's not PM, it's not the set of APIs, it's not all of that underpinning of an OS/2 environment—it's the look and feel. So you can drag-and-drop and launch apps and do the same things that you do on an OS/2 desktop.

### **You won't program to it but you will be able to use it.**

Right. So you get the same look and feel in the environment.

### **One other question about OS/2: Some people have expressed disappointment with the serialized input queue. One of the features they like about NT is using the mouse on a background application to bring it into the foreground at any time. Is that a direction you think OS/2 might go as well?**

It's certainly something we're going to solve in a Workplace OS environment—to have multiple input. There are some architectural issues in the current OS/2 with supporting multiple input queues. There actually is a problem that we're working on solving because of the single input queue—you can hang your system. So we're working on a way to solve that problem without really implementing multiple input queues because we don't know how to do that today in OS/2.

Thank you, Ms. Dimpfel. ♦



# WHEN DISASTER

**THE EARTH SHAKES. THE FIRE ALARM BELL STARTS TO CLAMOR SHRILLY. OR THE LIGHTS JUST FLICKER. AND ALL OF A SUDDEN YOU REMEMBER HOW MUCH OF YOUR COMPANY'S BUSINESS DEPENDS ON YOUR INFORMATION SYSTEMS...**

BY BARBARA DEPOMPA

**T**he World Trade Center bombing one year ago has become the single greatest catalyst in recent memory for the re-examination of company-wide disaster recovery plans. After the February 26, 1993, blast, tenants were forced out of their offices for six weeks while repairs were made. Damages were estimated at \$510 million.

Only a handful of the hundreds of World Trade Center tenants were adequately protected with backup data and off-site computing facilities. Attempts by the rest of the companies to operate away from their regular offices caused a city-wide shortage of leasing space, desks, PCs, telephone lines, and office equipment.

## Protecting Against the Inevitable

While a massive bombing is, fortunately, a rare occurrence, there are a frightening number of acts of God and man—events from the mundane to the truly monumental, from a power surge or outage to an earthquake—that can bring business to a standstill. Yet industry analysts have estimated that only a little more than a third of all companies have comprehensive contingency plans.

This despite the fact that a 1992 survey of Fortune 1,000 companies by Stratus Computer Inc. indicated that:

- The typical system outage lasts for an average of four hours—half a workday—and costs an average of \$329,000 in lost revenue and worker productivity.
- Computer downtime cost U.S. businesses more than \$3.8 billion in lost revenue and worker productivity in 1992 (the last year for which such research data was available).
- The average hourly revenue loss from downtime is \$78,000.

- Major businesses annually lose approximately 38 million worker-hours, or \$444 million in wages, due to downtime.

According to one expert in the field, there are two reasons why so many companies haven't rushed to protect their strategic business data through contingency plans that incorporate regular backups *and* off-site data storage and remote work sites. First, as businesses move from centralized data processing in the "glass house" to decentralized local area networks and client/server computing environments, disaster recovery planning quickly becomes *much* more difficult to implement and manage. Secondly, the cost of "adequate" protection is higher than many companies believe they can afford.

"It's not that disaster recovery is a technically impossible problem—it's just not a cheap problem to solve," says Jeff Marinstein, president of Contingency Planning Research in Jericho, New York. CPR is one of the only consulting firms in the U.S. specializing in disaster recovery planning for companies of all types and sizes.

Traditionally, the mainframe data center performed regular backups and contracted with mainframe disaster recovery vendors for off-site storage and off-site computing facilities when necessary. But that has all changed. Workstations that can access distributed databases have become a real-time data environment that's just as mission-critical as mainframe systems once were to businesses. "The majority of companies are tying PCs into local area networks and client/server computing environments, making disaster recovery a much bigger issue," says Lee Tydlaska, president of Computer Conversions.



# STRIKES...

These moves have added layers of complexity to disaster recovery. How do you decide what data on the network to back up? How do you protect distributed networks against data loss? What can be done to restore critical network operations within 24 hours?

In a LAN environment, disaster preparedness typically is considered a sub-set of ongoing network maintenance, and responsibility therefore lies with LAN administrators. But being able to recover not only from a major disk crash but from a fire or an episode of industrial espionage can be a substantial challenge—something far beyond backing up local hard disk drives. And there often isn't even a way for administrators to ensure that end users (or departments) are performing regular backups. That's why Marinstein stresses that companies must develop a written set of procedures for how data is to be protected.

In some cases, ironically, MIS directors have started to pull file servers back into the data center so they can easily and regularly be backed up. But that's hardly the norm. In fact, "Most companies haven't yet mastered a basic disaster recovery requirement—storing backup tapes or diskettes off-site," Marinstein said.

Face it: the *only* way to lessen the effects of a disaster is to have a comprehensive disaster recovery plan in place before it happens. And that may require a session with the bean counters. Many companies are finding that although PCs and LANs are relatively inexpensive, disaster recovery options are not.

The cost of recovery is easy to calculate. Just tally the total price of all systems and software in a current network environment, says Marinstein, and add 20 percent. That's what it would take to





## Disaster Recovery Tips

Given the costs and complexity, most businesses are searching for ways to perform disaster recovery on their own. Here are some steps to consider when setting up a contingency plan:

- **Form a team.** Despite the move to decentralized computing platforms, disaster recovery is one function that must remain centrally controlled. Because disaster recovery is both a business and a technical problem, the best way to plan is to form a team of business and technology executives.

- **Examine current operations.** Look at how your company runs. Develop a bare bones workflow chart that identifies critical processes and their dependencies. Based on that analysis, you can decide what process relationships limit your disaster recovery options. For example, one strategy some companies may want to consider is splitting critical processing among multiple locations. But this won't work if various departments must work together in the same building to get their jobs done.

- **Decide what's important.** Decide two key factors: what are the critical applications and how quickly must they be recovered. These are business, not IS, decisions.

- **Decide who's going to be in charge.**

### Outsourcing

If you choose to work with a disaster recovery company, be sure to check it out; after all, your business (and perhaps your job) are at stake. How much experience does the company have? Does the vendor work on a first-come, first-served basis, or is work guaranteed?

The most important factor in choosing the proper company is to make sure that all the equipment your staff will need for line-of-business operations is available, compatible, and functional. This includes not only your technology architecture, but also voice and data communication, and personnel support. One key question to get answered is how much time will it take for the vendor to respond to your disaster. How quickly, in other words, can you be up and running again? ♦

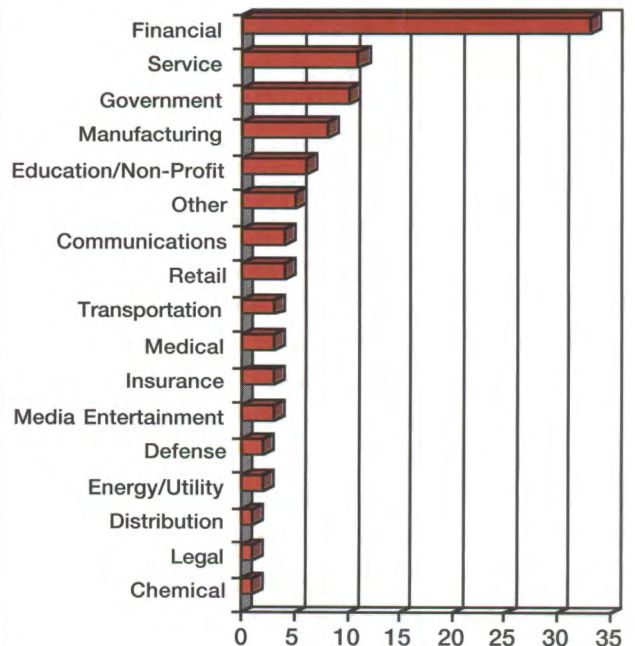
replace current operations. But, "in an era of low-cost systems, most companies aren't willing to pay more for protection than they paid to buy the systems in the first place," the consultant observes.

New applications running on re-engineered client/server platforms offer particularly complex backup and recovery challenges. "Most companies are doing backups in the easiest possible fashion without considering what it will take to restore the data," Marinstein said. Then, when a disaster strikes, they often must restore data to dissimilar systems or network topologies. Businesses must figure out how to be able to restore data selectively, so critical applications can be run on a smaller server or a different network.

Without strategically planned selective backups, it can take days to restore those critical applications to a new or dissimilar network. But taking the time to learn to perform selective backups is an issue most companies haven't considered, Marinstein said.

Then there are logistical considerations. If the network goes down—or, for that matter, an entire building is forced to evacu-

**Percent of Disasters by Industry\***



\*Highlights financial industry's low pain threshold

Source: Contingency Planning Research, Inc.



ate, as was the case in the World Trade Center bombing—businesses must realize they can't put 500 end users on a bus and ship them off to a company office in another city. About the farthest users should be required to travel is across town, Marinstein said.

### **Needed: Business Impact Analysis**

A comprehensive disaster recovery plan can come together only after an organization has performed a business impact analysis to determine the precise impact of downtime on each of the company's business operations. Managers must help determine what applications are critical and the time requirements for recovery. Technical personnel can then select from a variety of recovery options.

Some may decide to pre-wire another building to provide an alternate network operating site. Others may choose to inventory PCs and servers and develop a selective backup scheme to recover critical applications quickly. Still others may purchase disaster recovery services from IBM, SunGard, Comdisco, or one of the other disaster recovery providers that now offer pre-cabled off-site LANs.

If you choose to go out-of-house, you'll have to shop around. There are still no standard "generic" networks that interoperate with whatever hardware a client may have to provide an easy recovery option. As a result, no single vendor has found a cost-effective way to provide disaster recovery for most companies, Marinstein said.

### **A Success Story**

One of the few companies that was able to recover and return to operation quickly after the World Trade Center bombing was the New York branch of Asahi Bank, a Japanese bank with more than \$245 billion in assets. Asahi had a comprehensive contingency plan that enabled the bank to re-open for business without missing a single day of operation.

Thanks to an off-site computer center that housed a duplicate AS/400, a Digital Equipment Corp. VAX, and assorted terminals and PC workstations running OS/2, the bank was able to recover critical applications over the weekend and open for business the following Monday morning. The Telehouse Manhattan Center building that houses Asahi's computers and backup tapes served as the bank's home base for the next six weeks.

Telehouse provides an important form of disaster recovery service: a "safe house" for the equipment and data supplied by clients.

### **Disaster Recovery Resources**

#### **Amdahl**

1250 E. Arques Ave.  
Sunnyvale, CA 94088-3470  
(800) 538-8460  
Fax (408) 773-0833

#### **Cheyenne Software, Inc.**

3 Expressway Plaza  
Roslyn Heights, NY 11577  
(516) 484-5110  
Fax (516) 484-3446

#### **Comdisco Disaster Recovery Services**

6111 N. River Rd.  
Rosemont, IL 60018  
(800) 272-9792  
Fax (708) 518-5340

#### **Contingency Planning Research**

131 Jericho Turnpike, Suite 104  
Jericho, NY 11753  
(516) 997-1100  
Fax (516) 334-0020

#### **IBM Business Recovery Services**

P.O. Box 700  
Long Meadow Rd.  
Sterling Forest, NY 10979-0700  
(914) 759-4431  
Fax (914) 759-4680

#### **Micropolis Corp.**

21211 Nordhoff St.  
Chatsworth, CA 91311  
(800) 395-3748  
Fax (818) 709-3396

#### **Pinnacle Technology**

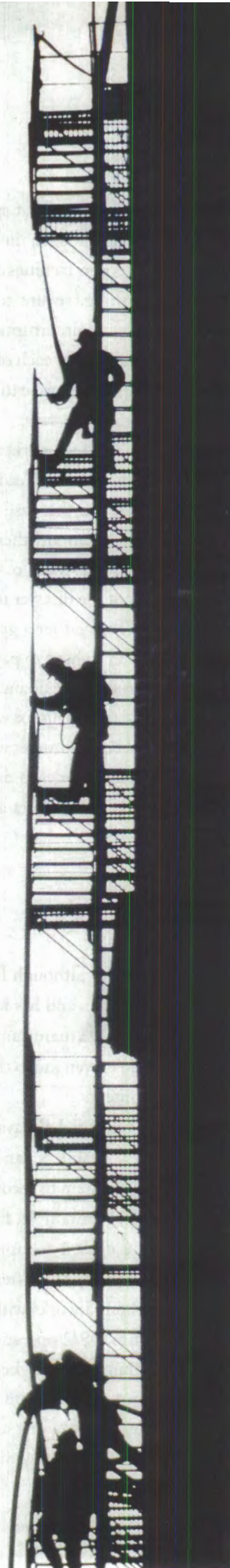
PO Box 128  
Kirklin, IN 46050  
(800) 525-1650  
Fax (317) 279-5157

#### **SoftTouch Systems, Inc.**

1300 South Meridian, Suite 600  
Oklahoma City, OK 73108  
(405) 947-8080  
Fax (405) 632-6537

#### **Sytron Corp.**

134 Flanders Rd.  
Westboro, MA 01581  
(508) 898-0100  
Fax (508) 898-2677





## SPECIAL REPORT

These clients rent space from Telehouse and pay an additional fee for time spent in Telehouse facilities following a disaster. The rent covers facilities containing raised flooring, redundant air conditioning, secure telephone lines, electric generators, battery power, uninterruptable power supplies, and even separate fire sprinklers for each office space—all the accoutrements needed to create a safe place to run computers, lights, and telephones for as long as necessary.

Telehouse markets its facilities to international financial institutions, such as Asahi, that have a low threshold for pain but are unable (in this case because the corporate headquarters is overseas) to support their own off-site safe house facilities. According to Jun Arai, a manager of Asahi's New York branch, the total cost of the disaster to the Asahi Bank was just under \$1 million.

That's either a great deal of money, or a bargain. It's a lot of money to have to pay unexpectedly, but that figure pales in comparison to the financial losses and federal penalties the bank could have racked up for each day it was unable to operate. Asahi officials' best estimates were that the bank would lose tens of millions of dollars for each day it was out of commission.

Those numbers aren't out of line. According to Marinstein,

when trading stops, the average loss per day for a small financial institution is about \$3 million. For a larger bank or brokerage firm, the daily loss can go as high as \$25 million.

### Plan for the Worst

It's human nature to think that things will always work out for the best. But more and more businesses are now aware that planning for disasters is critical. It should be part of a company's corporate business plan. "That's the long-term goal for many companies, but it will probably take years," Marinstein said, and probably a few more disasters as well, for most companies to act on this realization.

Until they do, business survival remains an expensive crap shoot. Most business managers aren't often found in Las Vegas, Atlantic City, or Monte Carlo. But most are gamblers nonetheless—betting that their systems won't crash, or that an IS disaster will cost them less than disaster recovery planning.

But just as is the case at the baize-covered tables, the odds are against these players. This means that when it comes to planning for a disaster, the only good gambler is a safe gambler—and the best is someone who doesn't gamble at all. ♦

## The OS/2 Solutions

**A**lthough IBM has its own Business Recovery Services and has long offered backup and recovery services for mainframe and larger midrange systems, Big Blue hasn't given much thought to disaster recovery in the OS/2 environment.

There is help available, however. Products offered by third-party suppliers can ease OS/2 users into regular backups and enable them to recover data and applications after a disaster.

If, for example, files are damaged or your system crashes, one tape drive backup subsystem that can lend a hand is Sytos Rebound, a disaster recovery utility from Sytron Corp. Sytos Rebound works with Sytos Plus, a backup utility, to recover the entire OS/2 operating system in less than 10 minutes. That's a winning option when you consider that most users currently must reinstall OS/2 from the installation diskettes. This daunting task requires installing as many as 30 diskettes, which can take well over an hour to complete.

Of course, you'll also have to reinstall the Sytos Plus backup utility to be able to run the Restore procedure. On a server, users may also have to reinstall the server operating system. With Sytos Rebound, the user no longer has to start that long, tedious process.

Combined with Sytos Plus, which is used for full system backups, Sytos Rebound can be a timesaving tool for data recovery. Sytos Rebound also works with IBM's LAN Server or Microsoft's LAN Manager servers.

Much like the Norton Utilities, GammaTech Utilities for OS/2, by SofTouch Systems Inc., contains system, disk, and file tools of the kind that DOS and Windows users have come to depend on. Deleted files can be "undeleted," and the software is helpful in performing volume recovery, optimization, and general maintenance operations without extensive technical knowledge of OS/2. The software can fix partitions, mark bad sectors on a hard disk, backup OS/2 .INI files, sort file allocation table (FAT) directories, and even detect viruses in the system. GammaTech



## SPECIAL REPORT

Utilities operates in both Presentation Manager (graphic) mode and in command line (text) mode.

Gaylen Fraley, senior programmer analyst for U.S. Sprint in Kansas City, Missouri, was a fan of the Norton Utilities before his department switched to OS/2 in January 1993. So he immediately purchased GammaTech Utilities and implemented the Sentry mechanism to perform backups every eight hours. "Sentry is great; it can store up to 99 generations of backups," he said.

Those backups get called on in many situations that are of less than hurricane magnitude but rank as disasters nonetheless. For example, something Fraley had done (he never was able to figure out what) had damaged his computer's start-up procedures and trashed his desktop. With the help of GammaTech Utilities he was able to restore the boot procedures and restore the desktop and all of his applications.

Then, a few months ago, "an application went errant, hosing up the system," Fraley said. Again, GammaTech Utilities restored everything completely. "I've never lost anything. I use undelete all the time. I couldn't put a price tag on the time and savings this utility has provided, but I wouldn't work without it," he said.

Dave Hurrell, president of Global Business Systems Inc. of Campbell, California, recently faced a disaster of his own. The application being tested by Hurrell, a software developer, had created errors on his hard disk. After powering down the system and rebooting, he found that his 240mb, 9,000-file D drive wasn't available.

Hurrell frantically started making phone calls. IBM had no solutions, but referred Hurrell to SofTouch. "I had all of those 9,000 files backed up on floppies over a period of one month." But that meant some files were more than 30 days old. "I wanted desperately to recover the data on the D drive rather than reformat and start over copying floppy disk files onto the system," he said.

SofTouch was able to help, and the recovery took only two hours. But it was a harrowing experience.

"The moral of the story is to wisely back up all of those files more often than I had," he said.

Hurrell has since copied all of his files to a new 1 gigabyte E drive, and is using drive D to store backup files.

ARCSolo v1.0 for OS/2 from Cheyenne Software Inc. is a storage management software program that provides backup and restore functions. It was designed for the OS/2 environment and uses a multithreaded structure to perform simultaneous operations that fine-tune performance. ARCSolo for OS/2 supports 4mm, 8mm, and QIC SCSI tape drives and offers a quick file access feature, for high speed searches, and a file tracking system that will rapidly locate data and begin file restoration.

Another useful disaster recovery tool is Desktop Observatory 3 from Pinnacle Technology Inc. Desktop Observatory 3 offers users the ability to rebuild their desktop interfaces almost instantly. After a disaster, each object must be built on screen, one at a time, from the template folder. It takes an average of four hours to rebuild the OS/2 desktop interface. With Desktop Observatory 3, the user's desktop setup is copied to a floppy disk, enabling the user to insert a floppy disk to reload that particular desktop interface, including all passwords and access codes.

This software not only saves time, but it also enables the user to move from one system to another without losing any of the customized features of his or her current environment. Desktop Observatory is also a useful tool for systems administrators in setting up new desktop systems, cutting the time it takes to set up a desktop environment.

Finally, one way to protect your system against data loss due to a hard disk failure is to use RAID—Redundant Array of Independent Disks. Micropolis Corp. makes Raidion LT fault-tolerant disk arrays for OS/2 or LAN Server-based systems, for example. The Raidion LT and RAIDWARE device driver software create a RAID Level 5 fault-tolerant storage subsystem designed specifically for OS/2. ♦





# The Storage Challenge

Mass Storage: Bigger, Cheaper, Simpler

BY JOHN HEILBORN

**R**emember when a 40mb drive was actually a high-capacity drive? Then you probably recall when Iran-Contra was *the* hot political issue, *Huey Lewis & the News* was at the top of the pop charts, and e-mail was a note left for a friend on a BBS.

Times have changed. Want to feel old? With the exception of PCMCIA drives for notebooks, the six largest drive manufacturers stopped building 40mb drives several years ago. Today, the lowest capacity drives built are 80mb to 120mb. And according to Gary Marks, vice president of marketing for storage products at Western Digital, by the end of this year no one will be making desktop storage disks holding less than 350mb.

Why the enormous jump in drive capacity?

Part of it is due to the fact that today drive manufacturers *can* build reliable drives that big. But the real driving force behind bigger and bigger machine storage is the dismaying fact that today's computers simply can't function with less than hundreds of megabytes of storage capacity. A typical installation of OS/2 alone requires 40mb—and that figure includes absolutely no applications. Add a word processor, an average-sized database, and an accounting system and you'll quickly increase the system requirements to several hundred megabytes.

It's gotten to be commonplace in cocktail-party conversation in technology and IS circles to skewer software companies for poor program management—adding in every bell and whistle the developers can conjure up and kludging the app together quickly for competitive advantage, and the devil take the memory overhead and storage requirements. Certainly we can all name some examples of precisely that. But much of this huge data space requirement is actually caused by a number of factors that are really of great importance to users.

Ease of use, for example, has become a very important productivity issue. But ease of use comes at a price. A graphic interface, icon-based navigating, menus, dialog boxes, and all of the help systems included in the new software use disk space—lots of disk space. Winword's Word Help system, for example—that's the help system, not the application itself—requires 3.4mb of disk

space. Beyond ease of use, people want flexibility, which means lots of drivers and DLLs, and elegance (how much space on your personal system is taken up by fonts and the video drivers to display and print them?), and color displays and graphics. And fun! These days this means sound, perhaps voice-enabling, and animation.

High-capacity hard drives are not new to the computer industry. We've had drives with capacities in the gigabyte range for a few years now. What is different today is the nature and number of the machines the drives are attached to, their physical size, and their prices.

Analysts report that business is finally beginning to see the productivity returns from the computer revolution. In 1992, U.S. productivity increased 2.9 percent, the biggest surge since 1976. This uptick came after years of spending money on IS—and waiting, and waiting, and waiting.

## Disk Storage Everywhere

Much of the improvement in line-of-business operations comes from decentralized, distributed processing—lots of hosts, servers, and client machines on desktops, hard-wired, wireless and WAN-connected, allowing data manipulation where the work is being done. Dumb terminals are rapidly fading into history; virtually all of those machines have disk storage.

So did the Kaypro 10, and the IBM PC XT, and that old AT over in the corner. But their old MFM and RLL drives seldom exceeded 100mb, and these new hard disks are very different technologically. Until recently, high-capacity drives used the successor to the original interfaces, a technology known as the Small Computer System Interface, or SCSI (pronounced *scuzzzy*). SCSI is more than a hard disk driver; it is a versatile, intelligent interface used to interconnect a variety of devices including hard drives, CD-ROM drives, printers, and scanners. The interface is fast, flexible, and can connect up to seven devices on a single computer bus connector.

The chief trouble with SCSI is that it is very expensive. Both the host adapter (the card that plugs into the computer) and the



## FEATURE

devices that connect to it must have a lot of electronics to communicate with each other. The SCSI host has its own BIOS and all of the devices on the SCSI bus identify themselves and automatically provide device specifications to the host adapter. This allows the devices on the SCSI bus to operate without being identified in the computer system's BIOS. As a result of this self-identification and device management, virtually unlimited hard drive sizes are possible with SCSI.

A few years ago, a new kind of interface called "Intelligent Drive Electronics" (IDE) was developed for PC-compatibles. This technology puts all of the interface electronics on the drive itself. Essentially, the only thing on the interface card in the computer is some simple buffer circuitry. This makes the IDE adapter very inexpensive—often as little as \$10 to \$15, even if the card includes serial, parallel, floppy drive, and game port interfaces. Additionally, because of their simple design, IDE drives are typically less expensive than their equivalent SCSI counterparts. Despite their simplicity, by the way, IDE drives can identify themselves and provide the system with their operating parameters automatically, just as SCSI drives do.

### Half-Gig Limit

The one limitation on IDE is that IBM PC and PC-compatible systems currently restrict hard drive sizes to a maximum capacity of 528mb. That's because of the standard drive parameter tables' inability to handle drives with more than 1,024 cylinders, 255 heads, or 63 sectors. This means that drives exceeding these parameters (with capacities of more than 528mb) cannot be used in standard systems without special drivers.

Since IDE works through the system BIOS, such drives also are limited to 528mb. Or, at least they were until a number of software manufacturers started producing special drivers that allow the system to use larger drives. At this time, two companies, Microhouse and OnTrack, produce drivers that allow using drives as large as two gigabytes (2,000mb). The primary dif-

ference between these two manufacturers is that OnTrack's driver (which is bundled with a number of drives including the new Micropolis 1.75gb IDE drive) currently cannot use the entire drive as a single partition. Instead, the drive must be divided into at least two partitions. With the Microhouse driver the entire drive can be used as a single large partition, if you'd like. The upper limit for IDE drives using these software drivers at the moment is 2gb.

But work on expanding the capabilities of IDE in standard PCs is not limited to external drivers. Phoenix Technologies Ltd., one of the largest BIOS manufacturers, has been working with various manufacturers (including hard drive manufacturers like Western Digital) to produce a "next generation" system BIOS capable of supporting huge hard drives as well as other devices like CD-ROMs. The company's list of goals is ambitious. Phoenix would like to see direct support in the BIOS for multiple IDE devices (beyond just hard drives), support for very high capacity hard drives (beyond 2gb), very high speed data transfer rates, and the new IDE CD-ROMs.

The BIOS changes that Phoenix recommends would provide for an extended drive parameter table as well as direct support for large-geometry drives. While the currently proposed BEEDD specification (BIOS Extensions for Enhanced Disk Drives, also known as the Phoenix Technologies Enhanced Disk Drive Support Specification) would also have an upper limit—8.4gb—it would allow for future expansion along similar lines. The only disadvantage would be the elimination of support for some of the very small capacity (below 20mb) drives—hardly a concern for the OS/2 user.

In return, the new BIOS would let the system boot from any connected IDE device, including CD-ROMs. This would allow software manufacturers to put entire systems on a CD, including all the necessary support for their applications. With this new proposed BIOS, the vendors of programs requiring large amounts of memory can actually ensure that users have all the resources they need.

How can we as users gain access to these new capa-





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Circle #187



## FEATURE

bilities? One way is by buying new systems. Companies like Gateway 2000 already have some new systems that include very large hard drives of 540mb and more. For users who want to continue using their current systems, Microhouse and OnTrack provide driver software to allow the use of very large IDE drives. Additionally, Phoenix sells a partially enhanced BIOS that supports large capacity IDE drives direct to the consumer via Micro Firmware.

With new momentum driving the IDE specifications, is there any reason to stay with SCSI technology? The answer is a clear yes if your data is mission-critical. SCSI remains the technology of choice—and the most thoroughly tested of the current choices—for data protection features such as RAID arrays and as an interface to tape backup units. While IDE is making strides, the corporate network server is still best served by SCSI. ♦

---

*John Heilborn has covered the industry for 32 years. He is the author of 55 books on computers and thousands of articles. Heilborn is probably best known for his syndicated computer column, "Ask Dr. John."*

## RAID to the Rescue

BY BRADLEY D. KLIEWER

**A**s drive capacities climb to the stratosphere, so does the chance for catastrophe. Losing a few hundred megabytes of data is bad enough; raise the stakes to a few gigabytes and you'll have a real mess on your hands. Contemplate that for a few moments and you'll find that a concept originally proposed for mainframes and minicomputers, RAID, holds more than a little appeal.

RAID (Redundant Array of Independent Disks), in simple terms a set of hard disks that operate as one, offers significantly greater data security reliability than a single drive system, and dramatically more than a non-RAID multiple drive system. The array expands on the error checking features of a single drive to provide error correction across multiple drives. If any single drive in the array fails, the system will keep running and the data remains intact.

RAID also simplifies system expansion. If you need additional storage capacity, just add a drive to the array. There'll be no more messing around with file distribution between drives and with

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- no down time during loss of a drive in the array

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## **FEATURE**

CONFIG.SYS and application .INI files. The downside is minimal: before adding a new drive you must back up the data, re-initialize the array, and then restore the data. Still, the backup and restore overhead typically requires far less work than whole-sale reconfiguration.

If you run mission-critical applications or face continual requests for increased drive capacity, one component of your disaster recovery planning should include RAID.

## **RAID Level Quick Reference**

While the RAID level—the scheme used for storing data on the multiple disks while assuring it is secure and replicable—may be one of the more noticeable pieces of information in the literature on RAID and in the advertisements for disk subsystems, save yourself some grief: ignore it. While reviewers may debate the merits of Level 3 vs. Level 5 (the two most common implementations), other design factors—caching and optimized management algorithms, for example—play a far more important role.

What types of features should you examine when considering a RAID array? Look at controller and power supply redundancy, the ability to do a hot data rebuild, hot swap and/or hot standby by availability, expandability, software vs. hardware implementation (and compatibility with OS/2), and performance.

For optimal performance, more disks are better than bigger disks. Likewise, multiple controllers are better than a single controller. One key reason is the fact that as the number of drives and controllers increase, so does the ability to perform parallel operations simultaneously.

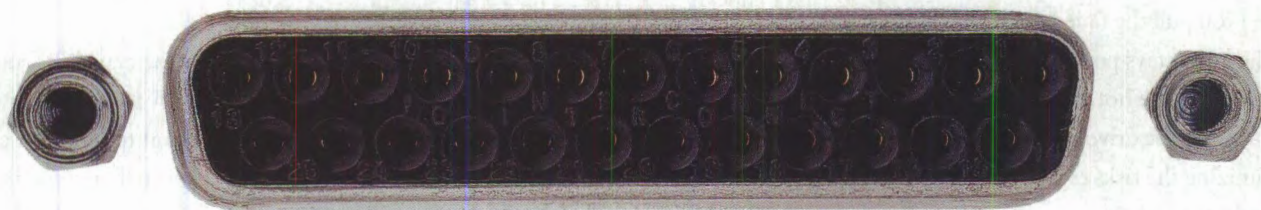
Multiple controllers convey an additional benefit as well: increased reliability through redundancy (some arrays offer multiple power supplies as well). However, controller failure is far less likely than drive failure—so reliability should not be a primary factor in selecting a multiple controller option. If continuous data access is truly critical, you should look to fully fault tolerant systems (perhaps using mirrored servers) that provide redundancy for the processor, memory, and network controller.

Beyond reliability, however, multiple controllers can boost performance. In the most extreme case—one controller per disk—fully parallel operations will improve data throughput markedly. When you compare the marginal improvements in reliability to the dramatic performance boost they convey, you'll soon agree that multiple controllers should be considered primarily as a performance enhancer.

In addition to performance, which affects your operations



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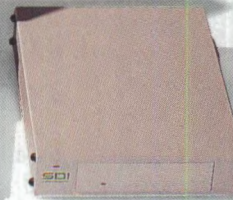
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today, you should also plan for tomorrow. Sooner or later, a drive will fail and you'll need to replace it. Many arrays offer a hot swap feature—you pull the failed drive out and replace it with another while the array stays powered up and accessible to the system. A similar feature, the hot standby, keeps an unused drive available on the array. If one drive fails, the standby goes into action, thereby minimizing the risks of a second drive failure that would bring all operations to a halt.

While hot swapability may be desirable, it relies on specialized hardware. Every RAID system uses software at some level. Micropolis uses the host processor (your 386, 486, or Pentium) in conjunction with pluggable modules consisting of a drive and power supply to make hot swapping possible.

If you need a hot swap feature for 24-hour data availability, you will need both software and hardware support (as found in products such as the Micropolis Raidion). If you can afford downtime for system maintenance (systems that may be idle overnight or over the weekend) or supply your own swappable modules, a software solution alone (such as Integra Technologies' OASAS and

Pro Engineering's EZRAID) would work. Just remember that a low-tech (but more economical) system remains vulnerable until the failed drive is replaced.

Depending on the array manufacturer, the new drive you swap in may need to be exactly the same model as the others in the array—check before you buy. You may want to purchase a spare if the array requires matching parts—especially for systems like the Micropolis Raidion which use proprietary modules. The last thing you want when a drive fails is additional downtime (and increased vulnerability) while you requisition a part and wait for the order to arrive.

Some arrays, such as those made by Ciprico, alleviate concerns about replacement availability by supporting any SCSI drive so long as it has the same or higher capacity than the drive being replaced (any excess above the smallest drive in the array goes unused).

Hot swap reduces data vulnerability. You can improve data availability with a hot data rebuild feature. Ideally, when the new drive (swap or standby) comes on line, the array will rebuild the



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## FEATURE

drive's data while the host system continues to read and write to the remaining drives. But if you set the rebuild priority too high, it may exact a severe performance penalty on the array—this in addition to a performance hit from working in error-recovery mode. Be sure to test the array in recovery mode before placing it on line.

Pay some attention to the management features the RAID array offers. At the very least, the system must signal a failed drive so that you can correct the problem and rebuild the array. As you move up the features ladder, the software may support user-configurable recovery parameters and array status indicators. Ideally, the vendor will provide OS/2-based utilities, but not all arrays require such support.

Indicators such as lights and/or audible alarms should warn of drive failures. These may be complemented by operating system- or environment-specific utilities. For example, Ciprico's utilities monitor messages passed through either the SCSI interface or the serial port. While not OS/2-specific, the serial port messaging allows monitoring through DOS windows and provides a conve-

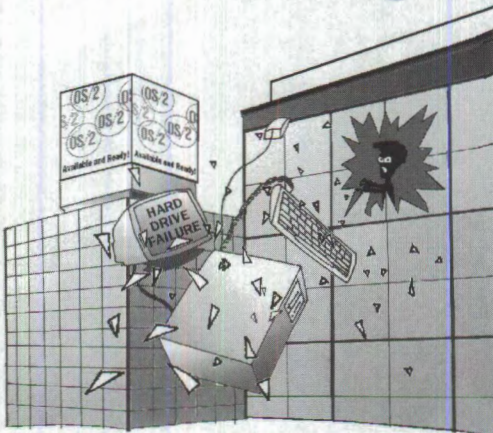
nient hook for programmers who want to write their own OS/2-based utility.

At the other end of the spectrum, software-based arrays such as OASAS and EZRAID require OS/2-specific drivers and management utilities. The software-based approach leaves your system vulnerable to a crash on the boot drive. However, such systems are more economical because they work with off-the-shelf hardware. As a result, RAID-enabling software is best suited for individual workstations and servers on small networks.

The demands on corporate servers—particularly as applications downsize to LAN environments—make standard PC disk architecture a risky proposition. Without additional safeguards, adding drives to a system proportionally decreases overall reliability—tripling the number of drives decreases the MTBF (Mean Time Between Failures) by one-third.

With its multiple moving parts, the disk drive is one of the least reliable components in your system. As your small systems grow, look toward RAID as an effective means for improving reliability throughout your organization. ♦

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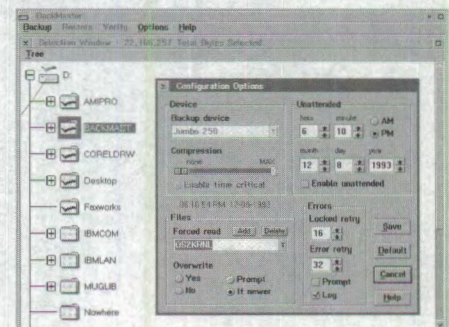
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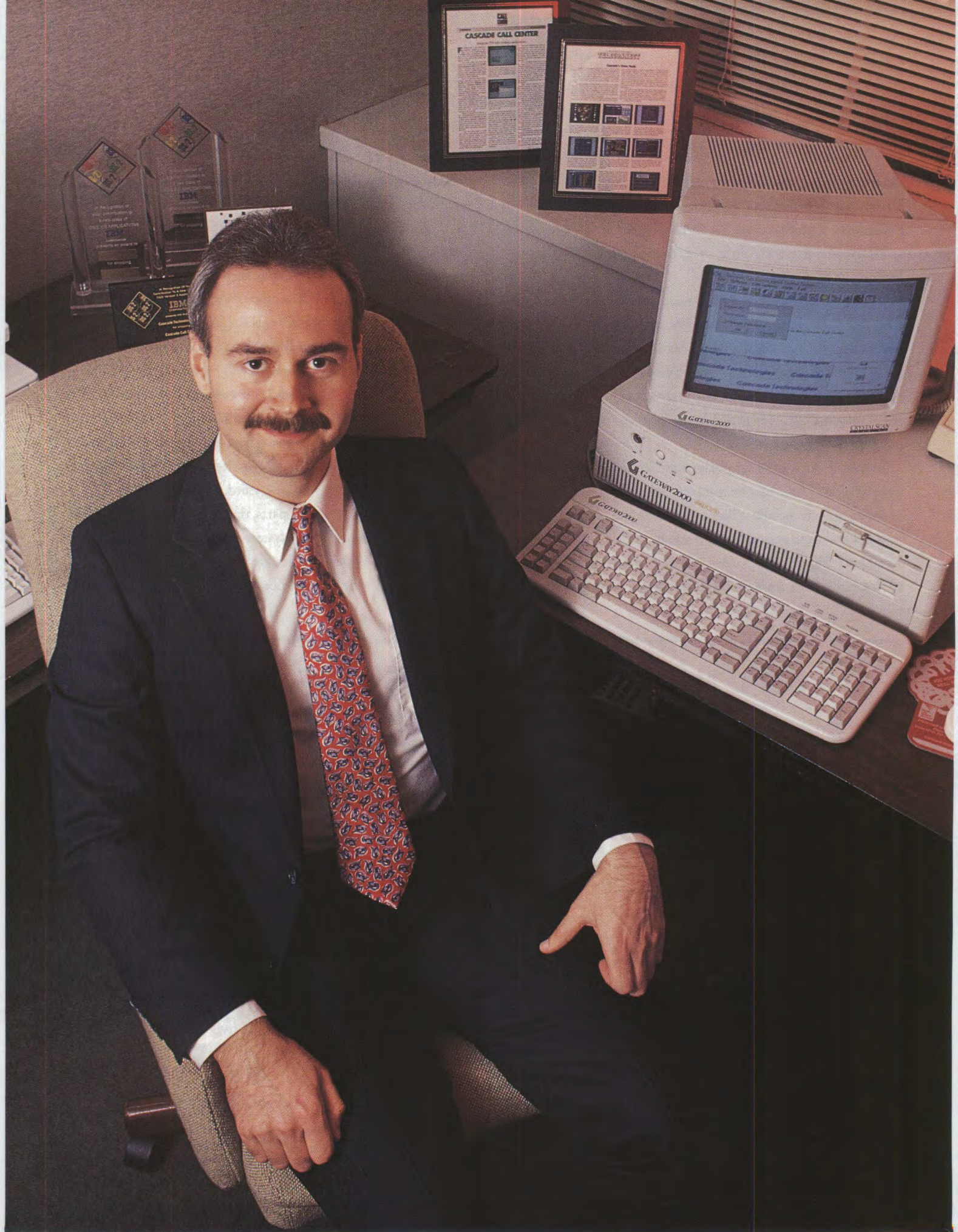


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# The Comfort Edge

As one of the three founders of Cascade Technology, Frank Joicy describes himself as living in the margins, and helping smooth the human-computer interface.

BY PATRICK HOWE

**Y**ou're on the phone, but you aren't talking—you're punching buttons to access your checking account balance. When you've reached the end of a maze of PIN numbers and tele-menus, the digital voice on the other end, speaking every syllable in a different, seemingly randomly chosen tone, tells you, *"Your check-ing account-bal-ance is zer-o doll-ars-and seven-ty-five-cents."*

Whoa! That can't be right. You just deposited your paycheck Friday! The blood begins to surge to your brain, carrying with it a small but growing nugget of panic. (The mortgage payment isn't going to go through! All those checks are going to *bounce!*)

At this point you need out. You need a person to talk this over with. You pound the "0" key to try and get hold of a human.

"Hello Mr. Johnson, this is Kelley with Smith Bank. Did you have a question about your checking account?" Friendly Kelley goes on to tell you your savings balance—*not* your checking account—is about one pay check larger than you thought.

Your pulse eases to its normal rate. Kelley already knows all the numbers you punched in and she has all the information you need up on the screen in front of her.

It is testimony to the fact that, although computers are powerful tools, they are most helpful when they make it possible for *you* to be treated like a human.

Welcome to the world of Frank Joicy, where—thanks to OS/2 technology—computers generate not just data but comfort as well.

Cascade Technologies, the company Joicy co-founded, isn't competing with the big guys. It isn't trying to develop a better word processor or spreadsheet. "That," says Joicy, who holds the title of executive vice president, "would be very foolish."

Instead, it is living in the margins, surviving by helping to make things more comfortable through applications such as the soft-

ware at work at your bank. Cascade's CAS Voice application automatically displays all the information you've been keying into the phone onto the screen of the customer service employee who's helping you.

If that sounds simple, Joicy would be pleased. It certainly is helpful, for both the customer and the company. Because the alternative—having to repeat all the information over the phone when what you really need is immediate help—can be maddening.

## A Piece of Cake

As Joicy tells the story, founding the company was a piece of cake. Following college at the Bernard Baruch branch of the City University of New York, Joicy started working at Morgan Guaranty, in the computer time-sharing group, working with the DEC/20. "It was very PC-like, very user friendly, with standard commands. People liked it. Because of that, it was the first place PCs gravitated to in 1982. I got a good early flavor for personal computers and I really felt then that was the way computers were going to go in the future."

Joicy then moved to Bankers Trust, where he started working more seriously with computers, even doing some programming. He also hooked up there with a former colleague from Morgan, Bill Colgan, who had developed a record-keeping system that is still Cascade's premier product. "That was really the genesis of Cascade," says Joicy. With Vigris Austad, Joicy and Colgan founded Cascade Technologies in 1985.

A piece of cake? Perhaps. But a little prodding reveals that the trio worked without salaries or an office for three years, meeting at New York University whenever they could to transact company business. Joicy continued to work part-time at Bankers Trust and lived at home, pouring all his money into the company.

The folks at Cascade Technologies had just moved into their



## USER PROFILE

first office—a respectable but far-from-posh Long Island locale—when they jumped on a brand new operating system, an unproven beta version introduced by a joint venture of IBM and Microsoft.

When they spent \$3,000 on an OS/2-based system in 1987, it was a major investment. It came in couple of big boxes, with documentation the size of an encyclopedia and some 30 diskettes. But Frank Joicy says it was money well spent: “We saw a kernel.”

That kernel has since become their edge. Joicy said Cascade is

knows 23 other people are on the same system.

What Joicy, 33, is doing with the help of OS/2 multitasking abilities isn't so much a bold leap forward as it is a reassuring glance back to make sure everything is going smoothly. He likes to talk about his software's “elegance,” and offers the same praise to the operating system he uses.

Making computers comfortable is what Joicy does. It's evidenced even by the way he talks. In a field that suffers from the over-use of jargon and arcane acronyms, Joicy mostly uses real words—simple ones whenever possible.

“We really exploit OS/2,” says Joicy. “We can really squeeze out a lot of power, a lot of features, and make easy-to-use systems that are very exploitable—extremely flexible. I think that's the best compliment I can give any system.”

**“We really exploit OS/2...we squeeze out a lot of power, a lot of features, and make easy-to-use systems that are very exploitable—extremely flexible.”**

the only company he knows of operating such a voice processing system using OS/2. Thanks to the multitasking abilities of OS/2, a Cascade Call Center running on a PC can support up to 24 callers simultaneously seeking information on anything from employee benefit plans to bank accounts. And none of the callers

It's hardly the only compliment, though. All of Cascade's literature touts the features of OS/2 as “the latest in computer technology.” And the company, by all evidence, is using the OS well. It was recently recognized for its efforts with an OS/2 Develop-

### A Bright Future

## The Technology: CAS Voice & Cascade Call Center

**C**AS Voice from Cascade Technologies is an interactive voice response system with a visual model-oriented application generator. The package turns an OS/2-based PC into a touch-tone phone voice menu system capable of responding to 24 callers simultaneously. LAN support is included, as is the ability to use ASCII or dBase III data files. Cascade Technologies also offers modules for mainframe host connectivity and Btrieve, dBase IV, and Oracle file format access.

The CAS Voice development environment uses visual models, shifting the emphasis away from programming and thus reducing development and maintenance costs. Menus are constructed by attaching voice instructions and assigning actions or additional sub-menus to the buttons of a telephone keypad displayed on the screen. The actions, called “voice application procedures,” are simply lists of processes that are performed in sequential order. These processes include playing recorded voice files, “speaking” information obtained from database links

(such as dates or numeric values), storing touch-tone input, and recording voice messages from callers.

In addition, CAS Voice provides a number of management and maintenance functions. Common and application-specific voice files are managed from the main menu and recorded on a telephone connected directly to the PC. A security module maintains caller IDs and personal identification numbers, preventing unauthorized access to the services offered. Another module allows an administrator to review and manage voice messages left by callers. An interactive fax module provides a link to off-load caller requests for documents to a fax server program. Finally, the package provides detailed usage statistics on individual calls (including caller ID, time on, and duration), and daily system totals.

A recent addition to Cascade Technologies' product line adds a “human touch” to its voice response system. Using CAS Voice as an automated front-end, Cascade Call Center soft-



## USER PROFILE

er Recognition Award from IBM. In addition, its CAS Voice system was recently designated an Editor's Choice by *Voice Processing* magazine.

Joicy sees a bright future for OS/2. He notes that "2.1 really gave us a boost." And he sees an army of users rapidly coming around to OS/2.

"People are really getting excited about it—especially 2.1. The popular press is really coming around and now ordinary users, not just technical people, are coming on board."

Companies like Cascade and people like Joicy may not be forging a revolution with what they're doing. But that certainly doesn't diminish their value. What they are doing is refining the technology, making incremental advances in agility, speed, and comfort. And in so doing, they're helping build toward a paradigm shift, from computer as data processing tool to computer as empowerer.

That's what counts to Joicy. And that's the kind of change—in the world at large, and in your relations with your bank—that can keep your savings account, and your blood pressure, in line. ♦

*Patrick Howe is a freelance writer based in Washington, DC.*

ware and hardware routes calls based on staff areas of expertise, call volume, or specific caller requests. A voice application procedure assigned to a menu choice can include a command to forward the call; a directed "hot key" (such as "Press zero for operator assistance") can also trigger response.

To increase efficiency, response time, and caller satisfaction, the system delivers specific data on the caller directly to the PC of the staff member taking the call. Cascade Call Center takes advantage of interprocess communications and named pipes across a network to start a client program on the remote PC. The customer service employee thus not only sees the caller's choices and input, but has immediate interactive access to supplementary information.

The integration of interactive voice response systems with call routing to customer service staffers provides an efficient and cost-effective alternative to manual call servicing. ♦

*Chris Wees*

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Photo of the SofTouch Systems staff by Ted West.

## VENDOR PROFILE

# Marketing *with a* SofTouch

Getting together with GammaTech allowed the Oklahoma company to put its own brand on the OS/2 marketplace.

BY ANNE G. LONGSWORTH

**Y**our company needs to be able to operate both East and West. You need to make deals both in laid-back, three-hours-earlier Silicon Valley and in fast-paced, first-to-the-sun cities like New York, Boston, and Atlanta. Doesn't it *almost* make sense, then, to start a software company in Oklahoma City, Oklahoma?

Besides, where on either coast would Rick Jones be able to raise his 35 head of steroid-free cattle?

Situated on the Oklahoma prairie, Jones can grow both cattle and computer products. He is not alone: SofTouch Systems, Inc., is one of 93 software companies (total employment: 1,284 people) in Oklahoma City, a largely agricultural area.

SofTouch began with a focus on the mainframe, offering a multiple-session OLTP (on-line transaction processing) manager for VSE and MVS environments. While that original line of CICS products continues to flourish, SofTouch has recently taken a tack towards client/server computing. And, more pertinently, it has concentrated its efforts on the OS/2 environment.

The two founders of SofTouch Systems, Inc., President Jones, 40, and Larry Akers, the 47-year-old vice president of research and development, met in 1977. Jones was a systems programmer at Globe Life Insurance; he and Akers, then president of Akers Software Consultants, worked together on a contract assignment. Jones went to work for ASC, Akers' company, in 1979.

After just a year Akers and Jones formed a second company called Progressive Software, which developed a 4GL application



## VENDOR PROFILE

development system for CICS. (The product was eventually sold to Computer Associates, which marketed it as CA-FlexiScreen.)

In addition to the 9-to-5 consulting business, Jones worked nights at his kitchen table developing a second mainframe product, CICS Windows, a windows sessioning manager that provides full transaction management within the CICS environment. CICS Windows became the basis of six mainframe applications that have been the "bread and butter" products for ASC, which in 1986 changed its name to SofTouch Systems, Inc.

It wasn't until early 1993 that SofTouch gained recognition in the OS/2 world. In May, SofTouch formed a marketing agreement with GammaTech Inc., a one-person operation that was developing OS/2 software.

GammaTech Inc. is Benny Ormson, an employee of the information services department of Southwestern Bell who develops OS/2 software in his spare time. Ormson met Jones and Akers in the mid-'80s on a contract job developing networking products. As Ormson taught Jones VTAM (virtual telecommunications access method) programming, they became good

friends. (Ormson, then a flight instructor, also tried to teach Jones to fly, but Jones soon discovered he felt more at home on the ground. "Flying is too scary," he says, "You can't just pull that airplane over to the side of the road when you get tired.")

Ormson developed GammaTech Utilities for OS/2 in late 1989. Since the initial commercial release of the product in 1991, Ormson has turned writing software into a full-fledged business, giving up his other hobbies, including flying and shooting. "I don't have any hobbies any more," he says. "I don't have time."

The relationship between Ormson and Jones and Akers developed further when running GammaTech started to get in the way of GammaTech. According to Ormson, "The business end of the business was more than I could handle. Plus, it wasn't what I wanted to do." So in 1993 SofTouch took over the sales and first-level technical support of GammaTech Utilities for OS/2, and of the two products released since then, GammaTech File Secure for OS/2 and GammaTech Power Pack for OS/2.

GammaTech focuses on the development of new products—these days, about one per quarter—and the more in-depth tech-

OS/2

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## VENDOR PROFILE

nical support. "If customers call with a problem we are unaware of," says Jones, "we get Benny involved at that point. We have multiple levels of support, but the customer deals with only one primary person who does the tracking for him."

GammaTech Utilities for OS/2 is a two-level data recovery product. It offers such functions as file undelete, HPFS file recovery, and FAT volume optimization and can be executed from the command line in case the OS/2 Workplace Shell is not working. The second level operates under Presentation Manager and includes disk volume analysis and compilation of system information.

Between its first release in March of 1991 and the involvement of SofTouch in May 1993, sales of GammaTech Utilities for OS/2 doubled. They have tripled since then.

The second product, GammaTech File Secure for OS/2, released in the fall of 1993, is an encryption program that uses Data Encryption Standards (DES) algorithms. The third product, GammaTech Power Pack for OS/2, also a late '93 release, is a library of tools including an extended attribute editor; an .INI

file editor for adding, deleting, or updating OS/2 .INI files; and a hot key that switches from active to inactive transactions easier than using Control+Escape to make a selection.

Two more products are currently in development: a set of REXX utilities for OS/2 and a security product for users in a LAN environment. Both are being developed by Ormson with some outside help from three contract employees. Current plans call for their release before the end of this quarter.

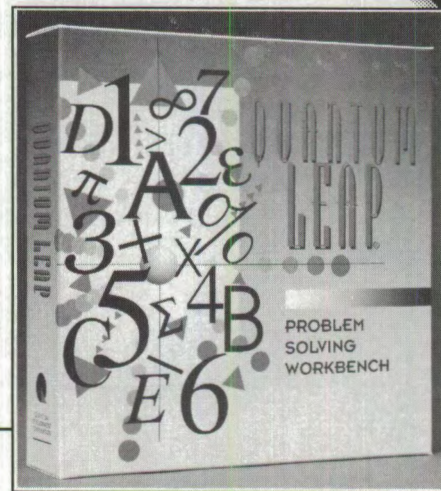
SofTouch's gross revenue is up 50 percent, from \$2 million in 1992 to an estimated \$3 million in 1993. And the once two-person company now employs 25 people in technical support, sales/marketing, programming, development, distribution, and accounting. In the opinion of one analyst, the success reflects the fact that the company is in the right place at the right time. According to Brent Williams, program director of PC software at International Data Corp., "The OS/2 utilities category is going to continue to grow. It will be interesting to see how the players do."

Company officials say the explanation for the sudden growth

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## VENDOR PROFILE

spurt is two-fold. First is a revamped marketing plan developed by Don Wardwell, vice president of sales and marketing, whose "Northeastern instincts were brought to the country" from Long Island in 1989. In the case of the GammaTech line, Wardwell focused on three areas of improvement: the look of the products, the OS/2 marketplace, and expanding the reseller network.

In creating a new package, "We were able to give a whole new image to the product line," says Wardwell. "Now it stands out on the shelf and looks very professional." SofTouch is particularly proud to be displayed in the cover picture of the OS/2 Solutions Pak from IBM Catalog. Says Jones, "We're right up there with Lotus and WordPerfect."

Learning the OS/2 marketplace was an intensive research challenge. Wardwell studied every aspect of how the public meets OS/2. He also approached business and individual end user communities and read all the popular magazines. "It was a question of where does the OS/2 user fit?" says Wardwell. "What's their profile? What kinds of needs do they have? My research involved lots of phone calls, reading, and talking with people."

Selecting resellers for the products was less of a task. Wardwell initiated relationships with Programmer's Paradise, the Programmer's Shop, and Indelible Blue, among others. "Indelible Blue popped up and it was a match made in heaven," says Wardwell. "Those are our three largest, but we have about 35 or 40 resellers."

The second factor in the company's growth is the work environment. When Jones started out in the computer industry, he was turned down at many jobs because he did not have a college education. The experience of job hunting has stayed with him, and Jones prides himself on "providing opportunities to people that would not have otherwise been given an opportunity." The staff includes an ex-manager from Taco Bell, Vietnam veterans, and older people who have been laid off for various reasons. "The age of employees ranges from early 20s to in their 60s," says Lisa Daigle, a workstation coordinator whose responsibilities include sales and technical support. "They bring a wealth of experience and knowledge with them."

It has taken more than a decade to complete the evolution from the mainframe consulting company Akers Software Consultants to an OS/2 software marketing firm called SofTouch Systems, Inc. Now that it has found its niche, however, SofTouch is here to stay. As Larry Akers says, "It took a while to get here, but this is the kind of job that every programmer wants to have." ♦





EYE ON THE MARKET

# ***SMP in the Air for OS/2***

Which would you pick as more critical to marketplace success, RISC or multiple processor support? IBM's answer speaks volumes.

BY MICHAEL S. KOGAN

**T**here's certainly SMPthing in the air in this new year—Symmetric Multiprocessing, to be exact.

With OS/2 SMP, IBM is taking its first step toward supporting multiprocessor systems. Developed by a small team in Boca Raton, the new version of the operating system enables DOS, Windows, and multithreaded OS/2 programs to run concurrently on multiple x86 processors while retaining the entire feature set and compatibility of OS/2 2.1.

While multiprocessing has been around for a long time, OEMs are now beginning to ship x86-based desktop multiprocessor systems that are appropriate for the high-end office client or server. These systems offer performance superior to that of uniprocessor 486 or Pentium systems without having to leave the Intel architecture for a RISC-based system. This is ideal for corporations that need a high-performance environment for downsized legacy software yet require optimum x86 software compatibility.

IBM has been working closely with multiprocessor OEMs such as ALR, AST, Compaq, Everex, NCR, NEC, Olivetti, Parallax, and Sequent, to name a few. OS/2 SMP is currently in beta test, and is expected to ship in the second quarter of 1994. Initially it will be available preloaded on OEM multiprocessor systems, and probably will ultimately be available as an installation option on the OS/2 CD-ROM.

OS/2 SMP is targeted for tightly coupled symmetric multiprocessing systems based on the 486DX and Pentium microprocessors. They range from small-footprint systems with 2-8 processors and 8-128mb of RAM to large-footprint systems with 2-16 processors and 16-256mb of RAM. Users requiring a higher degree of parallelism than available on a tightly coupled 16-processor system will have to wait for the Workplace OS, which

could ultimately support loosely coupled multiprocessor architectures as well.

## **Multiprocessing and Multitasking**

Multiprocessors are used to scale performance and throughput of CPU-bound operations—to increase their scope beyond that of a single-processor system—by allowing concurrent execution of multiple independent instruction streams. In general, multiprocessors improve performance whenever a system or application is multitasking—doing more than one thing at a time.

With OS/2 SMP, system and application performance and throughput is enhanced in two scenarios. First, OS/2 SMP runs multiple single-thread programs concurrently by assigning a processor to each program, thereby increasing the throughput of the system. However, a single-threaded program can never run faster than its maximum speed on a single dedicated processor.

The real power of multiprocessing, however, is in running multithreaded programs, with multiple threads running concurrently on multiple processors. The performance of these multithreaded programs can be improved by increasing the number of threads and having more processors available for execution.

## **Multiprocessing in the Enterprise**

In the enterprise, SMP will primarily be used to scale the performance of application servers. While file and print servers can improve performance by adding processors, since they are I/O-bound they do not get the dramatic scaling of performance achieved by CPU-bound tasks. Application servers such as Lotus Notes servers, database servers, and transaction processing servers are the best candidates for multiprocessing in the enterprise.



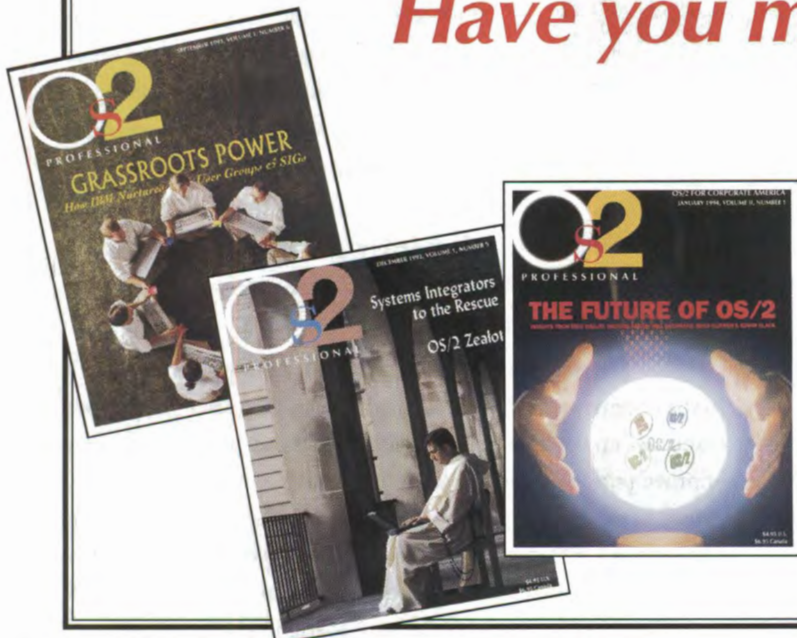


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## EYE ON THE MARKET

Today, when MIS professionals are faced with an overloaded server, the typical solution is to add another server to the domain. With OS/2 SMP and appropriate hardware, MIS staff can increase their server's power by adding more processors and memory to an existing system. Since most server programs use multiple threads for servicing their clients, they can execute multiple client requests simultaneously, and their performance and load tolerance scales dynamically with the number of processors installed.

Multiprocessing also provides an attractive alternative for high-end clients and standalone power users that need more horsepower. As software configurations get more complex and require better multitasking performance, a multiprocessor can provide a cost-effective alternative to buying a higher-powered uniprocessor system. Also, CPU-intensive applications such as 3-D rendering, CAD/CAM, and mathematical analysis have algorithms that are conducive to using multiple threads to parallelize computational tasks and increase performance.

### SMPing Up

OS/2 SMP dramatically extends the upward scalability of OS/2 without forcing the user to move to RISC-based systems. It capitalizes on the fact that the world is x86-based today, and will continue to be predominantly x86 in the coming years. In fact, with OS/2 SMP and inexpensive x86 SMP hardware, there is one less reason to rush to a RISC-based platform for better performance. It also gives IBM the breathing room necessary to complete Workplace OS, the portable version of OS/2, while allowing OS/2 to compete in the high-end client and server markets.

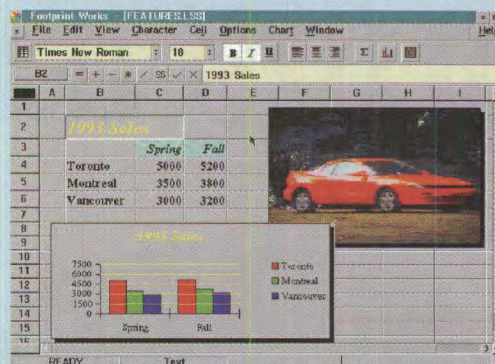
OS/2 SMP also brings to the table something that none of its competitors do: state-of-the-art x86 compatibility in a mature, reliable system. OS/2 is already recognized as the most compatible non-native DOS and 16-bit Windows platform in the industry, and OS/2 SMP exploits this strength to deliver a system that is ideal for downsizing corporations and power users.

With OS/2 SMP, IBM is demonstrating that it understands that multiprocessing support is more important than RISC support for OS/2 in today's market. Microprocessor technology advances will continually increase the uniprocessor speed limit, but parallel processing technology promises far faster throughput and performance gains in the future.

If you're still keeping score in the OS/2 vs. Windows NT battle, OS/2 SMP is an important notch in OS/2's belt because it leverages OS/2 into markets where it previously was unable to compete. Score one for IBM. ♦

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# Footprint Makes a Good Impression

This simple but useful program handles word processing, spreadsheets, charts, and simple databases.

REVIEWED BY RICH MALLOY

If you need more OS/2 applications on your system—and who doesn't?—give a call to Footprint Software. The folks there have a relatively new software package called Footprint Works that will go a long way toward solving your tools shortage.

What Footprint has done is combine five simple but useful applications with a relatively common interface for all of them. To be sure, none of the “applets” will win any feature wars with a standalone application. But the whole group fits in less than 10mb of disk space and sports a price tag of less than \$150—less space and less money than most standalone apps.

Footprint Works combines a word processor, a spreadsheet, a chart program, a database, and a database report generator in a well-integrated package. In addition to their similar menu structures, switching from one applet to another is relatively easy. Likewise, linking data between applets is a snap. But Footprint Works' best feature is that it takes full advantage of a 32-bit operating system like OS/2.

## The Word Processor

Overall, Footprint's word processor seems quite capable and reasonably fast. On my 486/66 speedster, it was not quite as lively as Microsoft Word for Windows running under OS/2, but it ran rings around an early version of Lotus's Ami Pro for OS/2. Although there were occasional split-second delays, I found it impossible to get ahead of the Footprint Works no matter how fast I typed.

The word processor has a surprising number of features. These include the now obligatory spell checker plus a thesaurus and the ability to hyphenate, create simple graphics, and format tables.

The spell checker and thesaurus are fairly competent for a Works-type product. You can theoretically use three spelling dictionaries at one time, a main dictionary (based on IBM's US dictionary), a secondary dictionary (although there are no secondary dictionaries available that I can see), and a third, custom dictionary, which you can modify at will. The thesaurus (or synonym feature, as Footprint calls it), can use only two dictionaries, one of them

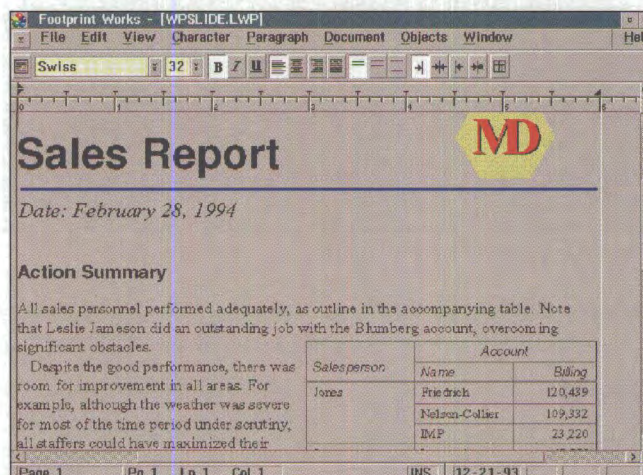
from Houghton Mifflin and the other currently blank. The synonym finder will not win any design awards, but it will show you several series of words for each meaning of a word (e.g., the synonym “hebetudinous” for “simple”).

## Tables and Graphics

The Table feature is impressive. To place a table somewhere on a page, you simply click on a table icon in the main tool bar.

A dialog box asks you how many rows and columns you want, and where the program might find data for the table. A notable feature is its ability to handle complex formats: you can divide an individual table cell either vertically or horizontally.

You can create some simple graphics right in a word processing document using a palette of graphics tools. This includes lines, boxes, circles, and regular polygons in various colors and hatching patterns. For more detailed drawing, you can also import graphics files from one of many different formats. These formats include old standbys such as .PCX, .BMP, .TIFF, .WMF, and .MET (the OS/2 metafile). You will also find some pleasant surprises: MacPaint, HPGL, and the WordPerfect bitmap formats. However, the increasingly popular Corel format is missing. As



Footprint Works word processor allows you to create simple graphics and relatively complex tables.



with tables, Footprint Works lets you flow text around the left or the right side of a graphic image, but not both.

When you select a graphic image, the cursor keys will move you to the next image. This can be confusing if you expect them to move the cursor as the keys normally do.

## Mail Merge

As you might expect with a program that includes both a word processor and a database, Footprint Works has a fairly decent mail-merge capability. In the next version, however, I'd like to see an easier way to select and verify a database subset for mail-merging.

The Word Processing module has so many features, it might be more instructive to mention not what it does have, but rather what it does not. The program lacks special capabilities for outlining, multiple columns, indexing, footnotes, grammar checking, equations, bulleted lists, and envelopes. Also, although the program has a macro capability, it is rather limited. You can use a macro to insert or delete characters, but a macro cannot access any program functions. If these limitations do not hinder you, you should feel quite at home with the Footprint Works word processor.

## The Spreadsheet

If you don't currently have an OS/2 spreadsheet, Footprint Works is an ideal candidate to fill that void. Like the word processor, it lacks some of the new spreadsheet features, but it has most of the features needed by typical users. These include a standard Windows-style graphical interface, allowing you to select the font and size (but not the color) of any cell and a good variety of functions, including text, financial, statistical, and trigonometric functions. What's missing? 3-D support and some type of what-if optimization feature.

## The Chart Part

When you generate a chart in the spreadsheet, the program links you to the Chart module of Footprint Works. This module, which also runs as a standalone applet, helps you to generate simple graphs. For example, you can create modest bar charts, stacked bar charts, and pie charts—but don't even think about 3-D.

I found one annoying quirk with the Chart module. When you

create a legend, explaining which color on the chart represents what series of data, it's difficult to move the legend to a desirable place. If you move it too close to the chart, the chart will shrink. If it is too far away, part of the legend may be clipped off.

## The Database Manager

Relational it's not. You won't be designing an accounting system for your small business on Footprint Works. But it is useful enough for small mail-merge operations, and simple enough to learn in a half-hour's time. With this database module, you can create nice graphical data-entry forms, but you cannot add such graphical items as radio buttons. For that you'll need a system

such as Borland's Object-Vision or Watcom's VX-Rexx.

Along with the database module you'll find a Report Module for creating database reports. If you have a database of salespeople, for example, you can quickly create a report showing sales for each person, with subtotals by department.

I experienced one minor quirk. I could create a page header for each page of the

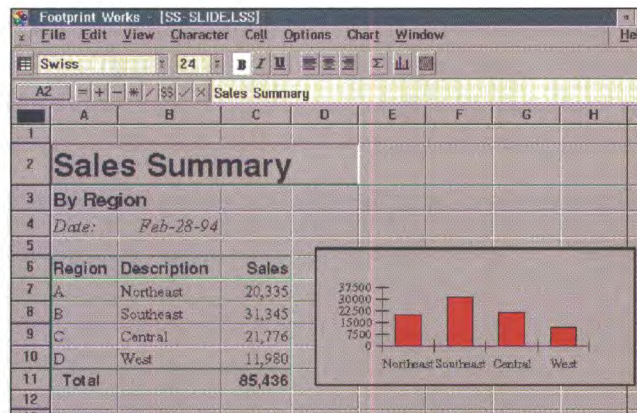
report, but the manual was unclear on how to edit the page header. A quick call to the Footprint Works Hotline, which was answered after one ring, resolved the issue (all I had to do was double-click on the header).

## Interoperability

Footprint Works has its own form of DDE that it uses to communicate between modules. With it, you can "Paste Link" data from a spreadsheet file into a word processing file, or from a spreadsheet file into a chart file. Once they're linked, if you change the data in the spreadsheet, changes will automatically appear in the document and the chart. However, I could not Paste Link from a chart file to a word processing file, or from a database report to a word processing file. All I could do was Paste the data from the clipboard. If the data changes in the chart or the report, I had to paste the new data into the document.

## OS/2 Features

With an OS/2 product, you expect good support for the Workplace Shell, SOM, and threads. Support for all of these features in Footprint Works seems adequate but not overwhelming.



The spreadsheet in Footprint Works.



## DOT EXE

The Workplace Shell features include the ability to drop a document—even a Microsoft Word document—on top of the Footprint Works icon to start editing it. Footprint Works also offers a series of templates. To create a new spreadsheet, simply tear off an icon from the spreadsheet template.

Some of the time-consuming operations in Footprint Work have been given their own threads, but not all of them. For example, if you print a large document, you can shift to editing that document while it begins printing in a separate thread of programming code (even before the print spooler takes over). But if you were to request a long search-and-replace operation, the program gives you no choice but to look at a clock icon.

SOM support is not available now, but should be shortly. In this current first quarter, Footprint expects to make available a SOM object for its word processor module, with a spreadsheet module to be available later. Developers who would like to add a simple word processor or spreadsheet to their programs could simply incorporate these modules into their code. For developers who need to act now, Footprint will license its source code (written in C).

There are two manuals, a tutorial (96 pages), and a reference manual (252 pages). Both are relatively small, about 5 by 8.5 inches) and, though concise, are adequate for most tasks. The tone of

the manuals seems aimed at OS/2 neophytes, which may be Footprint's target market. I often wished, however, for more technical help, at least in the on-line help facility.

Footprint Works is a much needed and well-executed addition to the OS/2 application repertoire. Like any Works

product, it has some omissions, and like any ambitious software project, it has its share of rough edges. But it definitely is a useful product. With it, I now find much less of a need to venture out into the DOS and Windows worlds. I have written two articles with it, including this one, and I have rarely felt the need to switch back to my old word processor.

How good a deal is Footprint Works? The regular retail price was set at \$149, which is not bad. But ever since the product was first introduced back in October, the company has sold it at a special introductory price of only \$99. This bargain price will stay in effect at least until April. Take advantage of it. ♦

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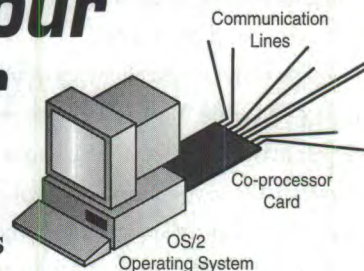
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Circle #149

February 1994 OS/2 Professional 53



# Getting PM Programs Up and Running

Gpf Version 2.1

BY STEVE MASTRIANNI

A friend of mine who is a Presentation Manager guru once told me that in more than six years of writing PM programs, he wrote only the first one from scratch. How could this be, you may ask? Simple: all PM programs look and operate essentially the same way, so new programs can be assembled from previous code with simple cuts and pastes.

This basis in a common architecture and functionality lends itself well to CASE tools that can draw on a database of standard functions. Gpf is such a tool.

Writing PM programs is a fairly time-consuming chore. As a software developer, time is very important to me; if I can find something that saves development time, I'll always buy it in favor of writing it myself. I was pleased to find that Gpf not only saved coding and debugging time, but actually made writing PM applications easy and enjoyable.

Gpf provides an excellent set of tools for generating and maintaining PM code. You first design your PM application in a prototype environment, and then run it with an emulator to test the operation. Once you're satisfied, you simply click on the code generator option and Gpf generates, compiles, and links the code automatically. Of course, the PM section is only a part of your program, so you still have to add your application-specific code.

## Getting Acquainted

The Gpf tutorial walks you through the development of three Presentation Manager applications at increasing levels of difficulty. Since tutorials are a handy way to learn a product from the vendor's perspective (not to mention a typical first step for many first time users in a foreign environment), I began working my way through the exercises.

The first tutorial emphasizes the basics of Gpf as you create a simple PM application with one main window and a logo window. I immediately ran into my first problem—the tutorial said to start the Gpf Editor, but the icon was nowhere to be found. I clicked on the Interface Builder icon in the Gpf folder, and lo and behold, the Gpf Editor screen appeared. With this minor

problem behind me, I continued working through the instructions, creating the first application.

The tutorial's layout could use some improvement. I made a few mistakes because I missed a few instructions along the way—some of the instructions sit too close to the screen pictures and are easy to overlook. Once I corrected my mistakes, the application prototype worked perfectly. Eager to take a look at the compiled code, I broke away from the tutorial and invoked the Gpf code generator (the topic would normally be covered in the second tutorial). I checked the code by compiling and linking it—and it worked exactly like the prototype without requiring a single manual change to the generated source code.

The second tutorial introduces the details of creating and applying a presentation object, an icon object, a dialog window, an action push-button, a bitmap object, group boxes, and radio buttons. To help test these more complex programs, Gpf includes an animation feature (which I used on the prototypes until they worked as I expected).

Again, the application worked exactly as outlined. However, in addition to my missing a few instructions, I encountered a few more problems along the way. Several times, Gpf would not let me access the source file, reporting a **File I/O Error Gpf006**. The only way I could correct this was to close Gpf and restart it. In one case, my source file was corrupted, and I had to recreate it.

## Adding Code

In addition to the extensive tutorial (which spans more than 100 pages), the manual includes some 30 additional pages of programming considerations for using Gpf. This is required reading if (like most programmers) you intend to add your own code to the Gpf-generated code. If you modify the generated code, you cannot go back and use the code generator again. Should you try, Gpf will overwrite the existing source, thus removing all of your changes. While Gpf automates the generation of the Presentation Manager code, that may be only a small percentage of your application.



## DOT EXE

To overcome these limitations, Gpf lets you create User Function Objects that can be used to modify the Gpf-generated source code safely. You can edit your custom source using any standard editor, and paste into the Gpf source via the clipboard. The preferred method is to store your functions in a DLL. You then place your function definitions in a custom header file with the same name as your application's definition (.ORC) file. At this point, Gpf will automatically recognize the functions.

By following this technique, you can modify and extend the functionality of your Gpf application without directly modifying

the code generated by Gpf. Alternatively, you can include your source code with an `#INCLUDE "myfunc.c"` directive. I find this method less desirable while reading my code listings, however, as I don't have all the source in one place.

The balance of the manual includes a 200-page Gpf reference describing the various pull-down menus and operations, the Gpf functions and

parameters, and instructions on writing your own controls for inclusion in your Gpf application. I had trouble reading some of the code examples due to the narrow pages—much of the code text wrapped to the next line. Fortunately, the examples also reside on the disk.

As you develop a library of resources, GpfTools (a set of object-oriented tools) helps you build new .ORC files by reusing objects from previous applications. You build the library of user interface objects by simply clicking on objects and dragging them to an .ORC file. GpfTools will also generate ASCII and INF files of the definition as well as help panel text.

### The Code Worked

I wrote a few simple PM programs to test the usability of Gpf in a real environment. In every case, Gpf produced code that worked perfectly and exactly the same as in the test environment. The code was clean, well documented, and made building the PM front ends a snap.

Gpf is an excellent prototyper and a great way to get Present-

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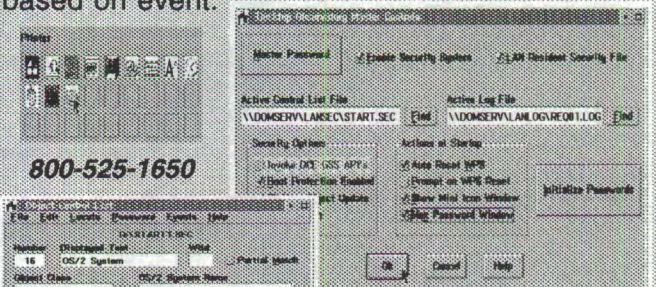
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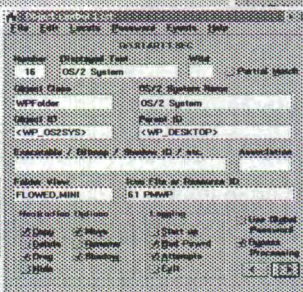
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tation Manager code up and running. It was quite satisfying to get a Presentation Manager front end for a simple application up and running within a few hours instead of a few days or weeks.

Gpf has a few shortcomings, however. Since important variables like window handles are kept in global memory, Gpf has trouble handling multiple instances of the same window. Gpf also does not allow you to specify resource constants.

The lack of support for User Interface Class Libraries, or ICLUI and other cross-platform class libraries, may limit Gpf's usefulness in a true object-oriented development environment. Gpf plans to

offer support for cross-platform class libraries in the future.

If you need to get your Presentation Manager program up and running in the shortest amount of time, Gpf is the tool to use. It will pay for itself in the first few weeks of use, and it will allow you more time to concentrate on your actual application. ♦

*Steve Mastrianni is an independent consultant specializing in OS/2 and OS/2 device drivers. He is currently consulting for IBM in Boca Raton, Florida. He can be reached on CompuServe at 73354,746 and on BIX as smastrianni.*

## Comm Talk

Pmcomm's latest revision continues a winning record of telecomm applications for OS/2.

BY HERB TYSON

**P**mcomm is a 32-bit Presentation Manager communications program for OS/2. The software has shown steady improvement in features and functions since its release as a 16-bit program for OS/2 1.3 in 1990.

Now in version 2.11, Pmcomm is multithreaded, supports user scripts and on-line command macros, and is amenable to unattended operation. Over the years, Pmcomm's features have expanded to include an extended, editable (and searchable) scrollbar buffer (see Figure 1), a toolbar, user programming (using either an internal script language or REXX, plus extensions written using C Set/2), as well as a number of other nice touches.

### What Makes It Different?

If all you want is a program that can communicate and transfer files, almost any terminal emulation program will work. Indeed, even OS/2's own much-maligned PM Terminal can get the job done. If, however, issues such as ease of setup, simplicity of use, and convenience matter to you or your users, you'll soon discover

er that PM Terminal is not the answer.

Using Pmcomm is a real pleasure. The operation is smooth, intuitive, and easy. In the case of a number of communications programs, I get the feeling that the programmer wrote a commu-

nications engine, and then slowly started grafting on kludges to make it work correctly. With Pmcomm, a lot of thought has gone into making it pleasant, comfortable, and complete. I also get the feeling that Pmcomm's author, Paul Breedlove, spends a fair amount of time using his creation, as well.

Many like to use the clipboard, for example, to copy and paste file names or parts of mes-

sages. If you discover a way to paste from the clipboard into PM Terminal, please let the rest of us know. With Pmcomm, however, just use the mouse to select the text and use the clipboard as you would in any other PM application: Ctrl+Insert to copy, Shift+Insert to paste. And Pmcomm adds a nice extra: you can use Alt+Insert to *append* to the clipboard, which is a handy way to assemble lists of file names for downloading.

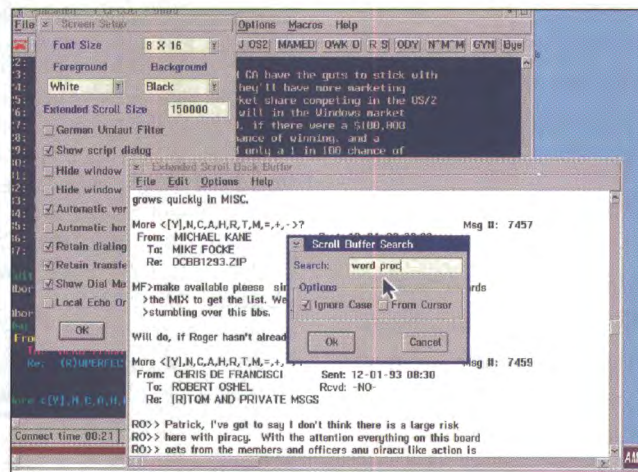


Figure 1.



## DOT EXE

Another nice touch is the way Pmcomm takes advantage of the mouse at times when it usually wouldn't do anything useful. When you get those Y(es) and N(o) questions, you have the option of double-clicking with the left mouse button on your response letter. Double-clicking the right mouse button "presses" Enter for you.

Pmcomm supports TTY, ANSI, VT100, and VT220 terminal emulations. The text size is adjustable using the same size options you get when running OS/2 and DOS command windows. Pmcomm also sports an optional status bar that shows the time, date, and terminal type, as well as the current elapsed connect time. It even lets you set an "alarm" that changes the color of the connect time display to red when it exceeds a user-settable time limit. Thus, if you have a BBS that allows you just 20 minutes, you can set the alarm to let you know when your time is almost up.

### Installation and Setup

An increasingly important consideration in deciding whether or not to embrace a new piece of software is the convenience of its installation and setup. Installation and setup of Pmcomm could hardly be any easier. One option is to simply copy the files from the distribution diskette to your hard drive (taking care to place a couple of .DLL files into a LIBPATH directory, or to modify LIBPATH to include your Pmcomm directory). Another option is to use Pmcomm's INSTALL program, which copies the files to the correct locations and creates a Pmcomm folder.

Pmcomm includes support for 28 popular modems, with preset configurations for models from Anchor, Digicom, Everex, Fastcomm, Hayes, IBM, Intel, Microcom, Multi-Tech, Practical Peripherals, UDS, USRobotics, and Zoom. Support for the Intel 14400ex and SatisFAXtion 400 (internal) was impeccable, requiring only a minor change (I don't like listening to the modem's dialing and connecting dialog). A Cardinal 2400 MNP modem, while not listed, seemed to work correctly using the Zoom HC2400R option.

If the preset configurations aren't to your liking, Pmcomm lets you change the initialization string, dialing prefix, and dialing suffix as well as the hang-up string. One especially handy setup feature is a choice of three different dialing prefixes and suffixes, which you can specify. This lets you optimize dialing prefixes for different systems you call, rather than having to settle for one-size-fits-all.

### Toolbar

A handy feature added in version 2 of Pmcomm was the toolbar.

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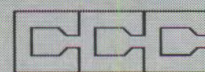
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While you can't reshape, detach, and move the toolbar the way you can in some other applications (DeScribe, for example), it nonetheless simplifies selecting options while on-line. To record actions to automatically generate a script, just click on the Generate Script tool. To open a capture file, click on the Capture tool. If you forget what a tool does, Pmcomm displays the tool's function on the status line when you move the mouse pointer over any of the eight tools (dial, capture, log, print, generate script, start script, port settings, extended scrollbar).

Pmcomm also lets you define up to 10 macros. These also are added to the toolbar, and can be assigned any identifying text you like. If you're more of a keyboard aficionado, you also can use Alt+1 through Alt+0 to run the macros.

### Scripting

Pmcomm supports scripts in two basic flavors: internal (using a straightforward native scripting language) and REXX. C programmers can also add dynamic link libraries compiled using IBM C Set/2. Using the scripting facilities, you can automate virtually anything you like. If you have a hard time getting started,

you can use Pmcomm's Script Generator to record a session, and then use the resulting file as a starting point for whatever script you care to write.

Pmcomm also provides, using the script language, a ready-to-use Host mode. It's easy to set up, easy to use, and it works! Not since Qmodem have I found it this easy to occasionally turn my system into a minimal remote system. It isn't Maximus or RBBS, but it certainly is convenient when you need to transfer files to and from a remote location.

Pmcomm 2.11 supports most of the popular file transfer protocols, including Zmodem (with optional auto-recovery), the preferred protocol on most BBSs these days. Most impressive is its ability to restart an aborted download right in the middle of the file. If you do a lot of long-distance transfers of multi-megabyte files, this feature can save

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### Other Surprises

Pmcomm supports drag-and-drop for file uploads. Now, I automatically open an upload folder each time I start Pmcomm. When I'm ready to upload a file, I just drag it from the folder and drop it onto Pmcomm. Pmcomm automatically opens an upload window and starts the upload using the default protocol.

Pmcomm also supports drag-and-drop of different telephone directory files. Just drag the one you want from a folder and drop it onto Pmcomm. You can select any number of entries from a directory and Pmcomm will attack them round-robin-style. Then you can just go about your business until your modem connects. When it connects, Pmcomm signals you with a beep.

As useful as Pmcomm is, there's always room for improvement. For example, it would be nice if Pmcomm used a Settings Notebook for setup and configuration. An expanded list of preset modem configurations would also be welcome. In addition, while I'm not sure how it might be implemented (especially when it

comes to interpreting ANSI color changes), I'm told that if it were to use a PM window rather than a text window to display on-line sessions, it would be faster and more user-configurable.

### Recommendation

Next to my word processor, my communications program is my most heavily used app, and I've been a paying customer of Pmcomm for years. The menu of OS/2 communications programs seems to be growing steadily; I've tried at least a dozen new entries in the past year, some for Presentation Manager and some that operate in text mode. But I've yet to find an OS/2 or DOS product that could win me away.

If you'd like to try it out, you can download the aging 16-bit demo version, 1.1 (usually PMCOM110.ZIP), from many BBSs. While the demo version is missing Zmodem and doesn't have a number of the new features present in version 2.11, it's still a good way to sample the basic look and feel. ♦

*Herb Tyson is a computer industry analyst and consultant and the author of several books, including Your OS/2 2.1 Consultant, 10 Minute Guide to OS/2 2.1, and the Word for Windows 6 Super Book.*

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## MARKETLINE

*Product News for the OS/2 User*

# SCOOPS

## OS/2 Service Pak

The OS/2 Service Pak, the first significant upgrade since the release of version 2.1 last summer, is expected to go into general release within the next month or so. Although IBM is being tight-lipped about the details of the maintenance release, developers were reportedly hard at work

in mid-January cleaning up the code based on the reports of beta testers. One IBM source indicated the beta's end-date was Jan. 17, and the product-to-be was in "shut-down" mode later that week. The official IBM release date is the end of Q1.

The Service Pak, which

reportedly will be available both on CD-ROM and in downloadable form from bulletin boards, should fix some 550 to 600 bugs in OS/2 2.1. It also will address one of the most persistent complaints heard about the OS: a lack of CD-ROM and S-3 video drivers.

When loaded over general release 2.1 code, the Service Pak will identify itself as OS/2 2.11. The upgrade won't install over OS/2 for Windows; IBM sources report a Service Pak for that product is planned.

## New Products

### Get ready for RAID

Pro Engineering Inc. has released EZRAID for OS/2, a software-based RAID solution for users of OS/2 versions 2.0 and later. EZRAID allows a user to combine multiple SCSI, IDE, and ESDI drives into a disk array that will be seen by OS/2 as a single logical drive, allowing the creation of larger files. EZRAID also can provide built-in data redundancy through disk mirroring or the use of Error Correction Codes. The suggested retail price of the product is \$795. Pro Engineering Inc., 1145 Hunt Club Road, Ottawa, Ontario, Canada K1V 0Y3, (613) 738-3864, fax (613) 738-3871.

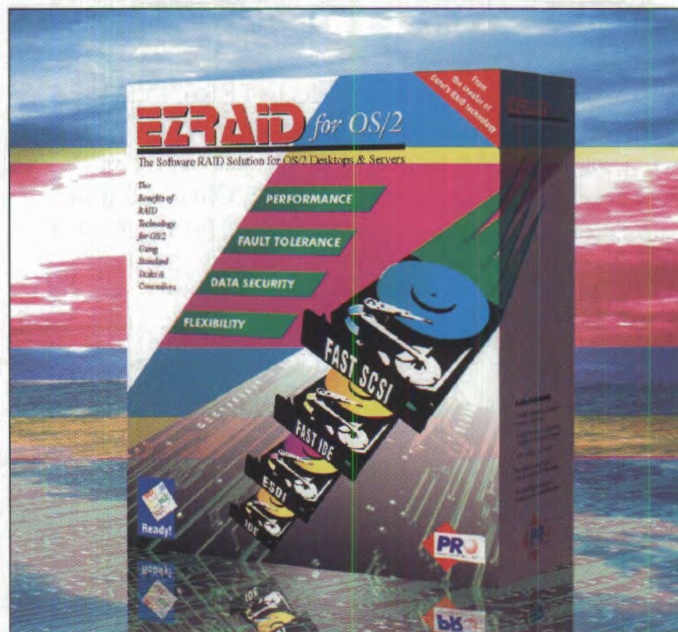
### Let's hear it for REXX

American Coders, Ltd., has released an OS/2 REXXBase

interface module. Targeted for OS/2 application developers, programmers, and users, REXXBase is an OS/2 DDL that allows REXX command procedures to process dBase files directly. REXXBase requires OS/2 2.0 or later and 500kb of disk space; the program supports both FAT and HFPS file formats. A shareware version is available through shareware channels for \$95. American Coders, Ltd., PO Box 97462, Raleigh, NC 27624, (919) 846-2014, fax (919) 846-2014.

### OLE-enabled BASIC

Softbridge, Inc., has released Version 3.0 of the Softbridge BASIC Language, an implementation of BASIC designed for application use. This embeddable scripting language, available for OS/2 and Windows 3.1 and NT, now



offers OLE 2.0 automation compatibility. This compatibility makes it possible to automate communication with any OLE 2.0-enabled products. An unlimited-distribution license for Version 3.0 is available beginning at

\$175,000; the price varies with different licensing schemes. Softbridge, Inc., 125 Cambridge Park Drive, Cambridge, MA 02140, (617) 576-2257, fax (617) 864-7747.





## Searching everywhere?

INTERA TYDAC Technologies Inc. is shipping version 5.3 of SPANS GIS. This collection of OS/2-based spatial analysis software modules is designed for professionals who need to analyze geographic information or who want to use GIS (the Geographical Information System). SPANS software can build and integrate spatial databases and accept and generate geographic information stored in a range of different data structures and formats. The new version includes

enhanced raster and vector translation support, expanded command modes, PCX support for slides, a modeling handbook and accompanying database, georeferenced raster support, and unlimited zoom capabilities. A full system consisting of 17 spatial analysis software modules is \$22,000; individual modules sell for between \$3,000 and \$5,000 each, depending on the module. INTERA TYDAC Technologies Inc., 2 Gurdwara Road, Suite 210, Nepean, Ontario, Canada K2E 1A2, (613) 226-5525, fax (613) 226-3819.

## Raiders of the lost disk

Procom Technology, Inc., has released the LANForce-5, a disk array subsystem that provides fault-tolerant storage at RAID levels 0, 1, 3, and 5. The LANForce-5 ensures protection of, and access to, data during a drive, disk, or power failure. The system can provide up to 12gb of protected storage for virtually any SCSI-equipped platform, including desktop machines running OS/2. The base price for the system is \$11,795.

Four models are available with prices ranging up to \$26,795. Procom Technology, Inc., 2181 Dupont Drive, Irvine, CA 92715, (714) 852-1000, fax (714) 852-1221.

## Walkin' in your footsteps

Footprint Works for OS/2 is now available from Footprint Software Inc. This 32-bit multithreaded application has five integrated productivity modules: word processing, spreadsheets, charting, data filer, and reporting. The

application costs \$99. Footprint Software Inc., 53 Yonge Street, 4th Floor, Toronto, Ontario, Canada M5E 1J3, (800) 465-8470, fax (416) 860-1780.

## Ease on down the data

DataEase International has added DataEase SQL Connect for the AS/400 to its product line. This series of drivers plugs into any or all of the DataEase DOS, OS/2, or Windows databases to allow users to access information stored on the AS/400 from their desktop PCs. It is available for \$1,295. DataEase International, Seven Cambridge Drive, Trumbull, CT 06611, (203) 374-8000, fax (203) 365-2317.

## NetWare backup

Conner Storage Systems has added Backup Exec for NetWare 4.0 software to its product line. The storage software automates backup and restore functions for all connected workstations. Backup Exec for NetWare 4.0 software has a range of disk backup and data

management features and is compatible with Novell's Storage Management Services, including data migration and data compression. In addition, the software has its own set of data management functions such as file grooming, job scheduling, and reporting. Backup Exec for NetWare 4.0 software can be used to automate backup and restore functions for NetWare, Lotus Notes and LAN Manager servers, and DOS, Windows, OS/2, Macintosh System 7, and Unix client workstations. It is priced according to system configuration. Conner Storage Systems, 36 Skyline Drive, Lake Mary, FL 32746, (407) 263-3500, fax (407) 263-3555.

## Is it magic?

Presto 2.1 is now available from Networx, Inc. This installation tool installs OS/2, adds network drivers, customizes the Workplace Shell, and applies service packs. The system administrator can centrally manage installation options for each workstation using the visual configuration editor. Installation can be performed from dedicated, non-dedicated, or portable code servers. Presto 2.1 costs \$995 through April 1 and will cost \$1,695 thereafter. Networx, Inc., PO Box 1571, Fairborn, OH 45324-1571, (513) 898-2904, fax (513) 898-2634.





## X Server on the wing

Hummingbird Communications is shipping eXceed/OS/2, a 32-bit X server that is OS/2 compatible. Using eXceed/OS/2 makes possible PC connectivity to all X Window System hosts in DOS, Windows, Unix, and VMS environments. In addition, users will be able to cut and paste within all the operating environments. The server costs \$645. Hummingbird Communications Ltd., 2900 John Street, Markham, Ontario, Canada L3R 5G3. (905) 470-1203, fax (905) 470-1207.

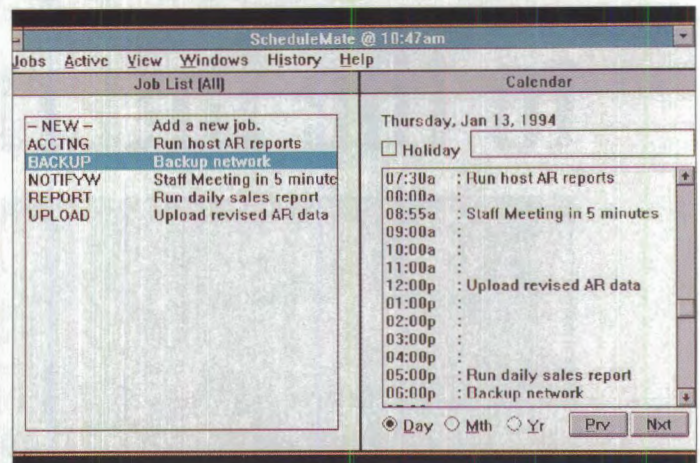
## Wyse up

Wyse Technology has announced its support for OS/2 for Symmetric Multiprocessing (SMP). Wyse's

Series 7000i Symmetric Multiprocessor Server can be used as a development and test platform for OS/2 SMP. The Series 7000i SMP servers are already available for Unix SVR4, SCO MPX, Windows NT, Windows NT Advanced Server, and Solaris operating systems. The price of a base model is \$17,995. Wyse Technology, 3471 North First Street, San Jose, CA 95134. (408) 473-1200, fax (408) 473-2080.

## Organize now!

ScriptMate 1.0 is now available through Satori Automation, Inc. This software tool allows users of DOS, Windows, or OS/2 PM 3270 emulators to automate routine micro-to-mainframe sessions. It is compatible with a range of 3270 emulation software including products by Attach-



mate, DCA, Eicon Technology, Forvus Research, IBM, ICOT, NetSoft, and Wall Data. ScriptMate uses a text file to execute tasks automatically, eliminating the need for operator intervention. The software also comes with ScheduleMate, a scheduler that allows users to run PC mainframe jobs at specified

times. Prices range from \$295 for a single user to \$995 for a five-user network license with significant discounts for volume users. Network and site licenses also are available. Satori Automation, Inc., 770 Old Roswell Place, Suite D-400, Roswell, GA 30076-1649, (404) 640-0904, fax (404) 518-3331.

# News

## Easy upgrades

Two companies have announced computer upgrade chips that can simply be plugged in to enable OS/2 compatibility. Improve It Technologies is shipping its Make-It 486 to upgrade 286 machines; Cyrix Corp. is offering a 486SRx2 Upgrade Microprocessor that clips on top of a PC's 386SX CPU. The products sell for \$250-\$700—much less than an expansion card.

## A decade ago...

Happy Birthday to C++! Ten years ago last month, programmer Bjarne Stroustrup

of the Computer Structures Research department at AT&T Bell Laboratories invented the language for use by his friends. C++ is currently the fastest growing language in the world.

## Allen, IBM deal

Allen Systems Group, Inc. of Naples, Florida, has announced the signing of an International Software Distribution Agreement with IBM. This agreement gives Allen Systems Group the right to distribute IBM software such as Database 2 OS/2 (DB2/2), Distributed Database Connection (DDCS/2), Client

Enabler, and Query Manager, in conjunction with ASG products.

## Hewlett-Packard buys in

Taligent, Inc., and Hewlett-Packard Company have announced that HP will purchase a 15 percent stake in Taligent, joining Apple and IBM as owners of the company and providing a much-needed infusion of capital and new energy. As a result of the long-rumored deal, HP will use Taligent's object-oriented products, including the Taligent Application Frameworks, the Taligent Development

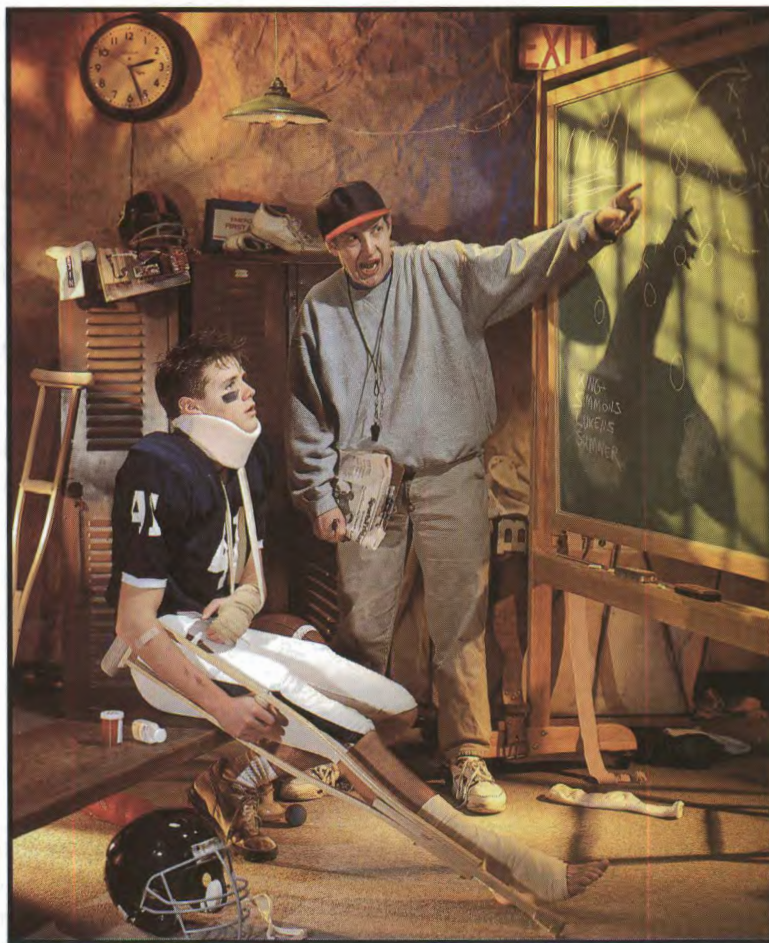
System, and the Taligent Object Services, on the HP-UX operating system. In addition, HP will license specific distributed object technologies, such as the HP DOMF (Distributed Object Management Facility) to Taligent.

## Name Change

Altium, an IBM subsidiary, has updated its product name, as well as moved its headquarters. The product, IBM CAD/3X, is the first CAD software available for OS/2. Altium, PO Box 18375, Boulder, CO 80308, (800) 426-2231, fax (303) 444-3594. ♦



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## BIX

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# OS/2 Commands and the RxQueue

BY TONY PEREIRA

**T**his month, we'll take a look at OS/2 commands issued through a REXX program. On the surface, issuing a command is easy: simply enclose the command in quotes and the line will be passed to the OS/2 command processor (CMD.EXE). But you can enhance this process by checking for errors during execution to insure that the OS/2 command was executed successfully.

In addition to processing OS/2 commands, we'll explore the REXX external queue, **RxQueue**. The queue can be used simply as a convenient data storage area for OS/2 commands. However, it also has more exotic uses, such as a communications depot for multiple REXX programs.

## OS/2 Commands

A common OS/2 command that appears in many REXX programs is:

```
'COPY C:\CONFIG.SYS C:\CONFIG.BAK'
```

This line creates a backup copy of CONFIG.SYS. However, you might want more than a single backup. Using REXX, you can write a program that creates a series of CONFIG.XXX files where XXX is the current day in the year. CONFIG.1 thus would be the backup created on Jan 1 and CONFIG.365 would be created on Dec. 31 (except in leap years).

```
/* Backup multiple versions of CONFIG.SYS */
today=Date('D') /*get the day of the year */
/* and call it 'today' */
```

```
'Copy c:\config.sys c:\config.'today
Exit
```

REXX interprets the third line as an unidentified character string (the part with COPY) concatenated to a variable. Before passing the string to the command processor REXX interprets the variable's value and appends it to the character string. You may place a variable anywhere within the string by closing the quotes, adding a variable name, and re-opening the quotes for an addi-

**TABLE 1**

<b>RXQUEUE</b> .....	Names and creates a queue
	Sets a named queue to be the current queue
	Deletes a named queue
	Provides the name of the current queue
<b>QUEUE</b> .....	Add a line to the tail of the current queue
<b>PUSH</b> .....	Add a line to the top of the current queue
<b>PULL</b> .....	Remove a line from the top of the current queue; if the current queue is empty, then wait for a line item from STDIN (normally the keyboard)
<b>Linein('Queue:')</b> .....	Remove a line from the top of the current queue; if the current queue is empty then wait for an item to be placed into that queue
<b>Lineout('Queue:')</b> .....	Add a line to the tail of the current queue (same as QUEUE)
<b>QUEUED()</b> .....	Returns the number of lines remaining in the current queue

**LISTING 1**

```
/* Backup multiple versions of CONFIG.SYS */
SIGNAL ON ERROR NAME ERRORRTN

today=Date('D') /*get the day of the year
               and insert it into
               the variable today */

/*The following line contains a purposely misspelled word*/
'Copi c:\D:\REXX\config.sys c:\config.'today
Exit

ERRORRTN:
SAY 'An Unexpected error occurred during execution'
SAY 'The Return Code was set as =' RC
Say 'The program line number was =' SIGL
Say 'The string associated with the error was:'
say CONDITION('D')
EXIT
```

**LISTING 2**

```
/*Create a named external queue and use it*/
Ctr=0
Say Date() Time() /* Print the current time */
MyQ=TONYQ /* Name your Queue */
```



## CODE CACHE

```
NewQ=RXQUEUE('Create', MyQ)
    /* Create your named Queue */

OldQ=RXQUEUE('Set', MyQ) /* Set your named queue
    as the current queue */
Do 10;          /* Do 10 date/time
    stamps on the queue */
    Do 5000; Ctr=Ctr+1; End; /* Waste some time */
    Queue Date() Time() Ctr /* Add the date/time
    stamp and Ctr to the
    queue tail */
End
Do Queued()      /* Do for as many items
    in the queue */
    Say linein('Queue:') /* Read the item on
    the Top of the queue
    and display */
End
Call RxQueue 'Delete', MyQ
    /* Delete the queue that you created */
Exit
```

### LISTING 3

```
/* ReadQ.Cmd—Create a named Queue if it
    doesn't exist */
/* Then read a line from the top of the queue */
newQ= RXQUEUE('create', 'TONYQ')
    /* Create a queue named TONYQ */
    /* If TONYQ already exists a uniquely
    named queue is created */
    /* The name of the newly created queue is
    returned in variable newQ */

oldQ=RXQUEUE('Set', 'TONYQ')
    /* Set TONYQ as the Current Queue for
    this process*/
Say Date() Time() /* Display the date and time */

qDate_Time = LINEIN('Queue:')
    /* Read a line from the current queue—
    if the queue is empty wait until a
    line is inserted into the queue */
say 'Date/Time from the Queue = ' qDate_Time

if newQ \= 'TONYQ' then rc=rxqueue('delete', newQ)
    /* If TONYQ already existed then delete
```

tional string. Thus, you could add support for a drive name variable called **DriveID** with the following line:

```
'Copy 'DriveID'\config.sys 'DriveID'\con
fig.'today
```

Be careful to balance your quotes when writing this type of statement. One of the most common REXX programming errors is **UNBALANCED QUOTES**.

One of several errors may occur after REXX passes a command to OS/2 (such problems are called “run time errors”). For instance, if the source file for a COPY command doesn't exist, COPY will fail. Fortunately, OS/2 commands notify REXX (or any other calling program) when a command fails by setting a nonzero return code. In REXX, this return code is passed back to your program in a special variable named **RC**. After the copy statement you could add:

```
If RC \= 0 then Do;
    Say 'Error during Copy'
    Say 'Return Code ='RC
Exit
End
```

### Signal on Error (TRAP)

Return codes make it possible for you to catch errors, but as usual, there's more than one way to skin a cat. REXX includes a facility that identifies and processes run time errors even when control passes to a command or routine outside your program. A REXX program invokes the facility by setting a conditional trap with the ON subkeyword of the **SIGNAL** and **CALL** instructions.

While that may sound like a mouthful, the process is fairly simple. For example, place a **SIGNAL ON ERROR NAME ErrorRtn** instruction at the beginning of your program to set a trap for any error conditions that might arise. Should an error condition occur, control transfers to the labeled statement following **NAME** (in this case—**ErrorRtn**). The **SIGNAL** works like a **GOTO** in other languages. Normally, **GOTO** (**SIGNAL**) is not considered proper structure in programs, but it is useful for handling error conditions.

REXX provides several pieces of information whenever an error trap springs. As with normal error checking, the special variable **RC** holds a nonzero return code.



## CODE CACHE

A second special variable, **SIGL**, contains the program line number that was executing when the error occurred. Finally, the built-in function **CONDITION** provides even more information. For example, **Condition('D')** will pass the description string associated with the trap condition. See Listing 1, which includes a sample misspelling error.

When OS/2 receives the misspelled **COPY** command it returns an error to REXX. Because of the trap set by **SIGNAL**, **ERRORRTN** takes control. It displays information related to the error and then exits. Of course, a more sophisticated program would analyze the error conditions and respond accordingly, thus making the program more user friendly.

### REXX External Queue (RxQueue)

A REXX external queue provides both a stack and a queue to the REXX programmer. That is, you can push an item, stack-like, onto the top of a queue as well as add an item to the end of a queue. Although you can place

```
the extra Queue just created */
exit
```

### LISTING 4

```
/*PushQ.Cmd—Create a named Queue if it
doesn't exist. Then add a Date/Time stamp
line to the top of the queue */

newQ= RXQUEUE('Create', 'TONYQ')
/* Create a queue named TONYQ */
/* If TONYQ already exists a uniquely
named queue is created */
/* The name of the newly created queue is
returned in variable newQ */

if newQ \= 'TONYQ' then rc=rxqueue('Delete', newQ)
/* If TONYQ already exists then delete
the extra Queue just created */
```

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```
oldQ=RXQUEUE('Set', 'TONYQ')
/* Set TONYQ as the Current Queue for
this process*/
Stamp= Date() Time() /* Make a Date/Time Stamp */
Say Stamp             /* Display the Stamp */
Push Stamp            /* Add the Stamp to the TOP
                      of the QUEUE */
exit
```

### LISTING 5

```
/* Free.Cmd - Display the available space
in a partition */
Arg Drive /* Assign parameter 1 to drive */
'DIR' drive '/-p | RXQUEUE /LIFO'
/* last line of a DIR is the free space */
Say linein('Queue:')
/* display the first line in the queue */
Do Queued(); pull; end
/* clear the remainder of the queue */
Return
```

### LISTING 6

```
/* EAspace.Cmd - Display the used EA space in a partition */
Arg Drive
total=0
'DIR ' drive '/s/a/n/-p | RXQUEUE'
/* Dir of all files + subdirectories in
HPFS format */
Do queued()
Pull . . . EValue . /* pull the 4th value */
If Datatype(EValue) = 'NUM' then
total=total+EValue;
/* Validate value as numeric-add to total */
End
Say 'Total Extended Attribute Space on ' drive 'is' total
Return
```

an item at either end, REXX always removes items from the top. You can have as many queues as your system resources can support. And since a queue is external to your program and can be shared with other programs running in the system, it can be used for communications between programs.

Typically, programs use the REXX external queue to direct the output of an OS/2 command into the queue, saving it for further analysis. REXX creates a default external queue the first time a REXX program places an item in the queue. All processes within a session share this queue. Therefore, it's good practice to explicitly create uniquely named queues beforehand (the queue commands are summarized in Table 1). After creating a queue, you must set it as the current queue for your process, as shown in Listing 2.

### RxQueue for Interprocess Communication

In general, you should delete a named external queue after your program has finished using it. However, you will need to keep the queue intact if you plan to pass information from one program to another using a named queue. Listings 3 and 4 illustrate two programs that communicate using a named queue. READQ.CMD (Listing 3) displays a Date/Time stamp and then reads from a named queue. PUSHQ.CMD also displays a Date/Time stamp and adds the data to the top of the same named queue.

Run these programs in two separate OS/2 Command Prompt windows in any sequence. Both programs attempt to create a new queue named TONYQ and set it as the current queue. PUSHQ puts a time stamp onto the queue; READQ takes a line from the queue and displays it. If the queue is empty, READQ will wait for another process to add a line to the queue. By the way, if TONYQ already exists, REXX will create and name an additional queue. The program checks for this and deletes the extraneous queue.

### Capture OS/2 Command Output in the RxQueue

As mentioned earlier, RxQueue provides a convenient place to capture the data stream generated by an external command or program (e.g., executing a DIR command



## CODE CACHE

and then saving the directory lines in the **RxQueue**). The following command issues a **DIR** command and "displays" the output into the **RxQueue**.

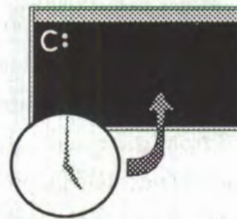
```
'DIR C: | RXQUEUE /LIFO'
```

This "displaying" is called piping the output into the queue. It can be piped onto the top of the queue (Last In First Out, designated **/LIFO**), or piped into the tail of the queue (First In First Out, the default, optionally designated **/FIFO**).

The program in Listing 5 displays the free space available on a drive. First, it reads the parameter (drive letter) from the command line into the variable **DRIVE** through the **ARG** command. The queue takes the contents of the directory listing, and then **REXX** displays only the last line (the remaining free space). Finally, the program cleans up the unused queue entries. To use the program, simply type **FREE** followed by a drive letter (for example, **FREE D:**).

Another informative utility, **EASPACE.COMD**, appears in Listing 6. It displays the total Extended Attribute space allocated on a drive. Both **FREE.COMD** and **EASPACE.COMD** use the

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February 1994 OS/2 Professional 69



default **RxQueue** (SESSION). All other processes active within a session share this queue. This is an important consideration since a program such as EASPACE.CMD will add many lines to the queue (for a drive with several directories). If it terminates abnormally (before the lines are removed from the queue), the data will stay in the shared **RxQueue**, and the next REXX program that issues a PULL instruction receives a line left by another program in the queue—not usually the desired result. To avoid such scenarios, set a trap at the beginning of your program. Use SIGNAL ON ERROR to remove all extra lines on the queue, and SIGNAL ON HALT to clean up after termination from a Ctrl-Break.

```
Signal on error name Errorrtn
Signal on halt name Errorrtn
...
...
Errorrtn:
Do queued(); pull; end
return
```

Unfortunately, even adding the SIGNAL ON HALT won't catch every possible error. If the user issues a Ctrl-Break during the execution of a command passed by the REXX program, the command halts outside REXX and the program ends without raising halt condition. For this reason, I recommend that you assign unique names to queues—create them when needed, and delete them when finished.

Hopefully, you've found REXX to be both easy to learn and enjoyable to program. I encourage you to delve deeper into this powerful language. For instance, spend time studying the string functions and parsing instructions. REXX also has debugging and tracing facilities and a performance-oriented MacroSpace facility for frequently used code segments. If you're not finding everything you need through the facilities provided in OS/2, there are already commercially marketed extensions to REXX for OS/2 that add Presentation Manager graphical user interface options, visual programming, and even multithreading. And in the not too distant future we should see an object-oriented REXX. Isn't there an old expression? "Long live REXX!" ♦

---

*Tony Pereira is president of the consulting firm, Clear & Simple, Inc. He is an active OS/2 developer, educator, consultant, and entrepreneur. His popular OS/2 product "PERFORMANCE 2.1—A Tuning Kit for OS/2" is written entirely in REXX.*

do well not to make the same error.

Given all these points, Windows NT may well be a fine OS, but it pales against OS/2's interface and capabilities. And even though I feel IBM should lower the price of OS/2 2.1, it beats NT there as well.

**Dwight M. Cannon**  
Elgin, Illinois

## Ferengi solutions

Reading through the November 1993 issue of *OS/2 Professional*—very good job.

With respect to "Ferengi" or OS2WIN3.1 (perhaps), we really need to know what is the comparison (pros and cons) of using Ferengi with Win 3.1, vs. using OS/2 2.1 full edition instead. Since I have OS/2 2.0, but never got it working on three of four machines we installed to, I need to know whether to upgrade eventually to 2.1 or Ferengi, since we have 3.1. Is Ferengi plus Win 3.1 more susceptible to crashes? My biggest problem is that using Winword 2c and Powerpoint 3 together to copy figures from PPT to WW2 frequently crashes Windows. Even though both come from Microsoft, their customer support and tech support deny this happens! Will Ferengi solve this?

**Dick Wray**  
via MCI Mail

*[Executive Editor Alan Kay replies: Hopefully our coverage of OS/2 for Windows in our January Special Report on the future of OS/2 answered your questions. If not, log into our OS2Pro conference on BLX for more information and feedback.]*

## Good chips

I would like to congratulate your magazine for its excellent article on the Power PC and the Pentium chip [Special Report, November]. The author covered almost every aspect of the two new processors, not only from the hardware point of view (as most magazines do) but from the operating system's usage. I would like to finish reading the other articles, but I'll have to fight my co-workers to get the magazine back!

**Anthony Mizzi**  
New York, New York

## Automatic help

I just wanted to write this note thanking you for the great magazine, which I really enjoy reading. I look forward to receiving each new issue.

I am currently working on a project trying out a new OS/2 File Transfer application (from IBM) called Optical Media Attach/2. It emulates a workstation as IBM standard tape drive and enables data transfer at the channel transfer rate. I did get this product to work to meet our needs, but was faced with the dilemma of finding the way to automate the whole down-load process, including all the key strokes that the operator would have to make.

*continued on page 74*





## TIPS AND TECHNIQUES

BY GORDON SCOTT

**S**ome things can be difficult to explain. When I was young I remember asking my father, a long-time real estate broker, how big an "escrow" was. "It must be big if a house can fit in it," I said. His five-minute explanation let me know I had the wrong idea, and I was sorry I had asked.

These days the roles in that exchange are reversed. The other day Dad asked me, "Just what is OS/2 anyway?" When I responded enthusiastically, telling him about features such as multitasking, crash-protection, and an innovative graphical user interface, his reply was, "Sorry I asked."

My second try took a simpler tack. "Dad, just think of OS/2 as the sequel to DOS."

If your friends or family members are running Windows and hear about "OS/2 for Windows," they may ask you about it. The following information may be helpful.

This special release of OS/2 is not an upgrade to OS/2 2.1. If you upgraded to OS/2 2.1 already you should not run out and buy this upgrade. (However, if you are still using OS/2 2.0 and have Windows 3.1 installed, take advantage of this low-priced upgrade.)

The Special Edition for Windows has all the same features of the original OS/2 2.1. There is nothing new in the way of functionality; the only difference is in the way OS/2 handles Windows programs.

Originally, OS/2 2.1 shipped with a specially modified version of Windows called WIN-OS2. This was real Windows code with a few important tweaks to make everything work smoothly under OS/2. With the Special Edition release, OS/2 works with Windows 3.1 more directly. This simplifies the task of upgrading from Windows to OS/2. It also lowers the price of OS/2 since IBM doesn't pay a royalty to Microsoft (and thus users don't pay for Windows twice).

Here is some information you can share with a Windows user about upgrading that won't make him or her sorry for asking.

**Be sure to check the README.INS file on disk 3 of the installation diskettes for special information.**

### How to do it:

- 1. Before installing OS/2, place installation diskette 3 in the floppy disk drive.
- 2. Using the Write program in Windows, or any text editor, open the file named README.INS located on the diskette.

**What this buys you: Important information about installing and upgrading.**

This installation README file includes details about DoubleSpace incompatibility and some special facts about various hardware devices. There is some important information about Logitech pointing devices, Quantum hard cards, Radius Monitors, and the ATI Graphics Ultra Pro card. If the system you are upgrading has one of these components, be sure to read this file.

**During the installation, migrate your DOS and Windows applications.**

### How to do it:

- Near the end of the installation routine (after disk 11, but before completing the installation), a dialogue box appears with three optional checkboxes. At this point, use these steps:
- 1. Be sure both checkboxes for DOS and Windows applications are selected.
- 2. Select the **Find** pushbutton. (A list of DOS programs will appear.)
- 3. Deselect any of the programs that don't need icons (e.g., programs you only run from the command prompt). To

deselect, click the right mouse button on any program in the list. If you do nothing, OS/2 will create an icon for each program listed and you can simply remove unwanted icons later.

- 4. Select the **OK** pushbutton to continue the migration. (Now a list of Windows programs will appear.)
- 5. Deselect any Windows programs that don't need icons (e.g. programs you will run only from a full-screen session).
- 6. Select the **OK** pushbutton to complete the migration.

**What this buys you: Two folders on the desktop full of icons representing your DOS and Windows programs.**

The migration utility isn't so useful when upgrading from one version of OS/2 to another, since the icons will already be available. However, when upgrading from DOS or Windows, migration can save you time.

The DOS migration routine places program objects (icons) for any .EXE file not identified as a Windows program into a folder on the OS/2 desktop. The Windows migration utility creates not only program objects, but folders for former application groups as well. The end result is a nicely arranged collection of icons in two folders, one named "DOS Applications," and the other named "Windows application groups."

The folder labeled "Windows application groups" contains several other folders—one for each application group in the Windows Program Manager. The application group folders, in turn, contain Windows programs. Each of these will start in a windowed (not full-screen) format. As a result, former Windows users will see their Windows applications organized as they were used to seeing them—only with the OS/2 desktop as the background.

This arrangement of icons may not be the most efficient desktop arrangement, but it is an effective intermediate



setup. With these two groups, Windows users can locate their existing software icons grouped in the way they are accustomed.

**Configure your OS/2 desktop  
to work more like the  
Windows desktop.**

**How to do it:**

- This procedure requires you to boot OS/2 from diskette. Have the first two OS/2 diskettes ready (the ones labeled "Installation disk" and "Disk 1.")
- Shutdown your machine, or start with it off.
  - Place the Installation diskette in the A: drive and turn the computer on.
  - When prompted, remove the Installation diskette and insert Disk 1.
  - After the OS/2 rings disappear, a grey screen with the words "Welcome to OS/2" appears on the screen. At this

point press the Escape key.

- At the command prompt, enter the command: CD OS2.
- Next enter: MAKEINI WIN\_30.RC OS2.INI (this step takes a few minutes).
- Remove the diskette and reboot your system.

***What this buys you: An OS/2 desktop that behaves very much like the Windows desktop.***

Windows or DOS users first experiencing the OS/2 desktop (or the Workplace Shell as it is called) must feel a bit like Dorothy after the tornado left her in Oz. The Workplace Shell can be a strange place compared to the world of Windows. This procedure gives the desktop a few Windows-like attributes.

For example, programs that are minimized appear as special icons placed along the bottom of the screen from left to right. The Program Manager icon is also placed on the desktop. These fea-

tures give the Windows immigrant a slight sense of familiarity, and therefore may help their productivity with the system in the early stages.

**Set Windows programs to start up  
in the same session to  
optimize performance or  
different sessions to maximize  
crash-protection.**

**How to do it:**

- Select the icon of a Windows program with the right mouse button (a pop-up menu appears).
- Select the small arrow next to the **Open** menu item on the pop-up menu (a new menu appears).
- Select the **Settings** item on the new menu (the Settings notebook appears).
- Select the **Session** tab in the Settings notebook.
- Near the bottom of the page select the

## Using and Supporting OS/2

### Two comprehensive support seminars by Mark Minasi, author of the #1 best seller: *Inside OS/2*

Some of the topics included in our new course *Using OS/2 2.1* are:

- How to navigate the Workplace shell (WPS)
- How to customize the desktop
- Understanding and configuring objects
- How to install new applications
- Explanations of little-used features that can be real productivity boosters like shadow and work-area folders.

For support staff, *Supporting OS/2 2.1* includes:

- Fixing WPS problems, including "the disappearing desktop"
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Circle #21



**Separate session** checkbox to give this program its own Windows session and protect it from other Windows programs. (Deselect this checkbox to specify this program be started in a common Windows session, allowing the program to start more quickly.)

**What this buys you: Optimized performance or better crash-protection (either one, but not both). Each time OS/2 starts a Windows program, OS/2 will start a separate instance of the Windows executable code. Each instance will be separate and protected from the other instances. If one Windows program crashes, all the others are safe. This protection is not free, however; the price is that each instance of the Windows code requires its own active memory. If the system has no more than eight megabytes of RAM,**

**performance could diminish with only two Windows applications open.**

The reason is that the default amount of memory each Windows instance allocates is four megabytes. With only two applications running, the OS/2 swapfile is so busy it's like having a revolving door on the hard drive. If you find that the hard disk light flashes quite frequently, then you know your system's performance is slower than it could be.

Windows programs can all be run with the same set of Windows code by deselecting the **Separate session** checkbox. This is more risky, but if your programs aren't prone to crash and you don't run too many programs at one time, the performance gains are worth the risk. The second Windows program you open starts quickly since Windows has already loaded (ditto for any others you start). There is a trade-off here that

requires some evaluation of your work patterns. You may want to try both ways and see which one you like best. ♦

.....  
Gordon Scott writes online help and tutorials for OS/2 applications at IBM's Santa Teresa Laboratory in San Jose, California. Share your tips with OS/2 Professional readers by sending them through the Internet to [gscott@stkvm22.vnet.ibm.com](mailto:gscott@stkvm22.vnet.ibm.com). Gordon Scott can also be reached normal business hours at (408) 463-4483.

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*continued from page 70*

Thanks to the article titled "Automated GUI Testing For Everyone" [Eye on the Market, November], I did find the product (WITT from IBM) that can automate the download procedure for us. I am currently evaluating this product. Your article made me realize that I can use one of these products not just to automate the testing, but to automate the process itself. Thanks again, you made my job a little easier.

**Elena Nanos**

*Chicago, Illinois*

## Nice complaint

First of all, I would like to complain about your people at the Comdex booth: They were handing out back issues of your magazines! If that wasn't bad enough I had to carry these all the way back, and now, on a sunny Sunday, I'm reading these instead of playing with the cat, talking to my wife, wind-surfing.

**Voytek Eymont**

*Chippendale, NSW, Australia*

## Still bashing?

Please drop the obsession with NT. Focus on OS/2 issues, news, tips, and help to those that may have problems. Why not have articles on the OS/2 Trap errors and what they represent? I would expect the vast majority of problems people have with OS/2 are hardware problems (i.e., flaky hardware or incompatible hardware). OS/2 really works the hardware. I have found through experience that Trap 2, 6, 8, and D errors and unexplained hangs usually indicate hardware problems. I have also found that the best support of OS/2 is as close as your nearest modem. The OS/2 echoes on the IBMNET, Fidonet, and Internet are fantastic support communities, as are the OS/2 User Groups.

**Will Firstbrook**

*Delta, BC, Canada*

## More on FaxWorks

The early '90s have been a difficult time for the U.S. economy with many companies either cutting back staff, moving,

or calling it quits and shutting down completely. During this time, many companies in our industry have bashed each other to maintain and increase market share. Personally, I'm tired of the bashing!

Along comes a company that has developed an excellent piece of fax software, FaxWorks, only to be bashed [Input, October and December] for using its logo on the default cover sheet that comes with the software. The last time I checked, we are still living in a democratic society where competition and Yankee ingenuity are still accepted practices. I see no bashing here. I see a company that has used its noodle to promote a product worth promoting albeit its customer base. As a licensed customer, I have no problem using SofNet's default cover sheet with my fax correspondence, and, if I did, I'd change it. The last time I checked, it is an option that comes with the software. Come on guys, enough is enough.

**Bill Torelli**

*Wayne, Pennsylvania*

## Letters to IBM

OS/2 2.1 and all its vestiges are now deleted from my system. I have a long and difficult saga with OS/2. I first installed OS/2 2.0 in May 1992. I bought and paid for the maintenance package to fix the bugs in the original program. I finally gave up and erased OS/2. I jumped on 2.1, and what a disappointment. I haven't even received my \$30 rebate!

Under OS/2 I experienced decreased performance, incomplete migrations of programs, and crashes so complete I had to re-boot using a DOS boot disk. I had to reinstall to get OS/2 running again, so I could delete the hidden files, so I could get back on my hard drive.

Your Windows bashing is ill-advised. IBM and OS/2 have missed the boat. If this system works so well then why do IBM-OS/2 support people have the complete dis-installation instructions ready for the dissatisfied user?

Windows 3.1 is superior to OS/2 2.1, for my needs. Obviously, I am looking for something better or I would not have invested the time nor the money to

try OS/2. I do not have a crash problem with Windows, and the system delivers consistent dependable performance. Under OS/2 I constantly went to the dual boot feature to get back to DOS so I could get my job done.

The promise of a 32-bit operating system is a strong lure; unfortunately IBM does not have the ability to set the hook. Maybe in the future, but not with 2.1. I'll probably be dumb enough to try the next version, but somehow I don't think IBM will get it.

**Charles C. Ryan**

*Front Royal, Virginia*

Would you spend your hard-earned money for an automobile that after you had paid for it you could not drive it out of the dealer's lot without calling in a factory representative to get it going—and perhaps not even then? Or a car in which you had to memorize 150 gearshift positions before you could get it home? Or pay an additional steep premium for the manufacturer to correct the mistakes made in your brand new car? Would you buy a new car if first you had to go to a trade school to learn how to use it?

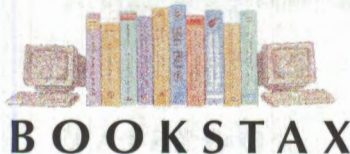
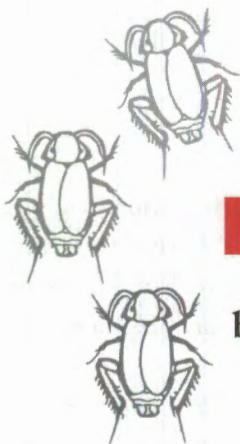
We do it all the time when we buy computers, computer programs, and operating systems, be it DOS, Windows, or OS/2. We are constantly putting a pig in a poke, about the only place left in American life where this stupid practice is done, and done to the tune of billions each year.

I approached IBM's OS/2 with high hopes and expectations that it would do what operating systems should have done 10 years ago: be simple to install and use, transparent, a system which stays out of the way so I can get my work done. Instead, I found myself spending more time on OS/2 than my work. Not very smart, eh! By necessity I have had to go back to DOS and Windows, not because they are good—in automotive terms they couldn't compete with the Model-T—but because it is either that or return to the typewriter and paste pot. ♦

**Edward W. Mullins**

*Tuscaloosa, Alabama*





# High Tech Joke Book

by Oak Ridge Public Relations, Inc., 190 pages, \$14.95

REVIEWED BY WAYNE RASH JR.

Imagine every computer joke you've ever heard, including the ones that aren't very funny. Add to that all of the humorous computer- and engineering-related observations about why things go wrong. Then imagine that nearly everything politically incorrect has been removed (which includes nearly all of the really funny stuff), and you have an idea of what Oak Ridge Public Relations' *High Tech Joke Book* is all about.

In fact, about the only minority group that gets to suffer jokes at its expense is engineers.

**Q:** Why are "Blonde Jokes" so short?

**A:** So engineers can remember them!

There are others like this, including a collection of light bulb jokes about engineers, and another series of jokes about Microsoft Chairman Bill Gates. Regardless of whether engineers deserve to be the butt of such jokes (they do, of course), the book is clearly aimed at those same engineers. A few of the jokes, for example, take the form of logic diagrams that require an engineer to even *understand* the humor.

Unfortunately, this book isn't as funny as it could be, and it's more than just an effort to avoid conflicts with the politically cor-

rect. In the middle of the book is a long section containing many variations on Murphy's Law, Finagle's Law, and other lists of why things go wrong. Despite the fact that this has already been done elsewhere, it could have been done well here, given some originality. It wasn't. Instead, it's just the same old stuff you've seen before, all collected in one place. In fact, it's collected more than once, so you'll see the same law repeated two or three times on successive pages.

Still, there are some funny spots, most of which stem from the hand of the authors rather than the jokes they collected. I had high hopes when I read the biography of Oak Ridge, the Surgeon General's warning, and the list of completely fabricated celebrity endorsements. Sadly, delight quickly turned to disappointment when I realized that I'd heard or read nearly every joke before.

On the other hand, there's not much else out there, so maybe the *High Tech Joke Book* is a little like the joke it contains about computer documentation:

**Q:** Why is documentation like sex?

**A:** Because when it's good, it's very, very good, but when it's bad, it's better than nothing. ♦



## No Bugs!

Delivering Error-Free Code in C and C++

by David Thielen, Addison Wesley Publishing Company, 206 pages, \$24.95

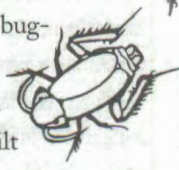
REVIEWED BY ALAN JAY WEINER

**D**ebugging is easy. All it takes is a minute or two to change the offending line of code. Knowing *what* to change is more difficult. But detecting the bug in the first place can be the most difficult of all.

David Thielen has seen—and caused—his share of bugs, and has collected an arsenal of techniques to eradicate them. More than simple after-the-fact debugging, his techniques force bugs to stand up and announce "Here I am!"

While recognizing that no software is truly bug-free, Thielen's methods assist in detecting bugs long before they otherwise would be found. Finding bugs early means the code can be built on a solid base, making the final product as error-free as possible. Ultimately, both development time and cost are reduced.

Thielen espouses not only a methodology but also a philoso-





## BOOKSTAX

phy surrounding program bugs. Even the use of *bug* to describe program faults is misleading, he argues, since it implies that someone else put them there. In fact, as the developer, you wrote them yourself. You're human; humans make mistakes. So Thielen embraces the position of a developer he once knew, that bugs should instead be called Massive -ah- *Foul-Ups*. (His term is more graphic.)

MFUs exist. Your task is to find and remove them.

As you write software, some MFUs are immediately obvious: the program crashes or produces clearly incorrect results. These are the MFUs you'll exorcise immediately. If *all* bugs were discovered during day-to-day development (and therefore fixed immediately), it would be significantly easier to deliver error-free software. *No Bugs!* provides the tricks to do just that.

### Debugging Routines

Some of the techniques are simple and familiar: **Debug printf's**, assert statements, and parameter checking. *No Bugs!* improves these by defining them as macros, which are easier to use and more readable than the usual **#if/#endif** blocks.

Other techniques—validating data structures and memory allocations, for example—are more elaborate. They check that structures haven't spuriously been modified, that pointers to objects really point to those objects, and that memory blocks haven't been under- or over-written.

Many programmers use these techniques ad hoc. Often they're quickly coded to detect some immediate problem, and then removed or disabled once the bug at hand is fixed. Thielen's MFU-detectors stay in the source code, their activation controlled by a level-of-debugging definition at the beginning of the file. As new versions of the software are developed, all the previous debugging tests may be reactivated. This assures you that changes haven't broken something that was once working.

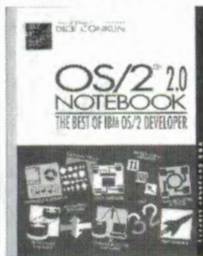
Separate chapters on assembler and C++ show how to adapt to those languages the techniques discussed. For example, redefining **new** and **delete** in C++ detects bugs such as using a variable before it has been set or after it has been deleted.

Compilers catch some of these bugs, but they can be fooled. In assembly language, preserving and checking registers as a routine

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exits will detect erroneous register corruption. By setting other registers to constant values or known bad values, you can catch routines that work only because they just happened to have the correct values in them.

Most of the techniques are short and designed to be implemented as you write other code. A few, such as debugging windows, are support functions that involve quite a few lines of code. Thielen provides listings in an appendix. Unfortunately, no diskette is included with the book although one is available at additional cost.

The tricks in *No Bugs!* rely not on a rigid set of rules but on several general principles. They range from the requirement that debugging code not modify either the data or the code path to putting comments about open issues inside the code itself. By carrying these principles to a degree rarely seen, this approach allows the program to protect itself from subtle changes—changes that would delay the detection of bugs.

### The Testing Process

How do you effectively test a large product? Simply shipping it

to some beta testers isn't a guarantee. How many of the beta testers will be running the same sections of the code? How many will become disenchanted with the bugs they find, to the point where they may even stop using your product before it's released?

There is a better way to test, and Thielen describes it. You'll learn all about white-box and black-box testing, the Bug Master, and how to run a beta test. These are techniques that made DOS 5.0 one of the most bug-free products in Microsoft history.

*No Bugs!* is an easy-to-read, no-nonsense book that belongs on every serious programmer's shelf. And its techniques belong in your daily coding. Even though the book is written for programmers, anyone involved with software development and testing will benefit from the testing and product-release chapters. In fact, Japan's interest in quality software has driven *No Bugs!* up to number two on the list of top-selling computer books. ♦

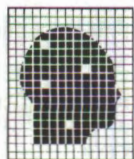
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*Alan Weiner is president of Technology 21, a consulting firm in Waltham, Massachusetts. He can be reached on the Internet as arweiner@bix.com.*

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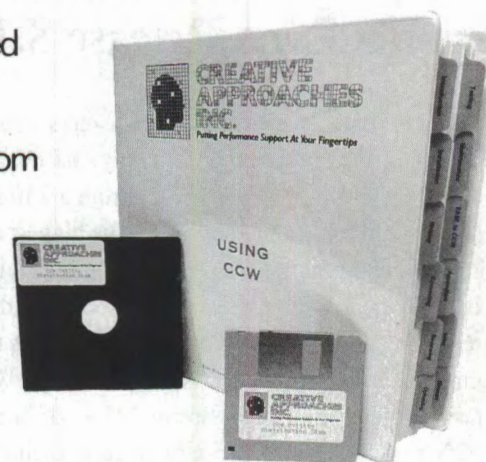
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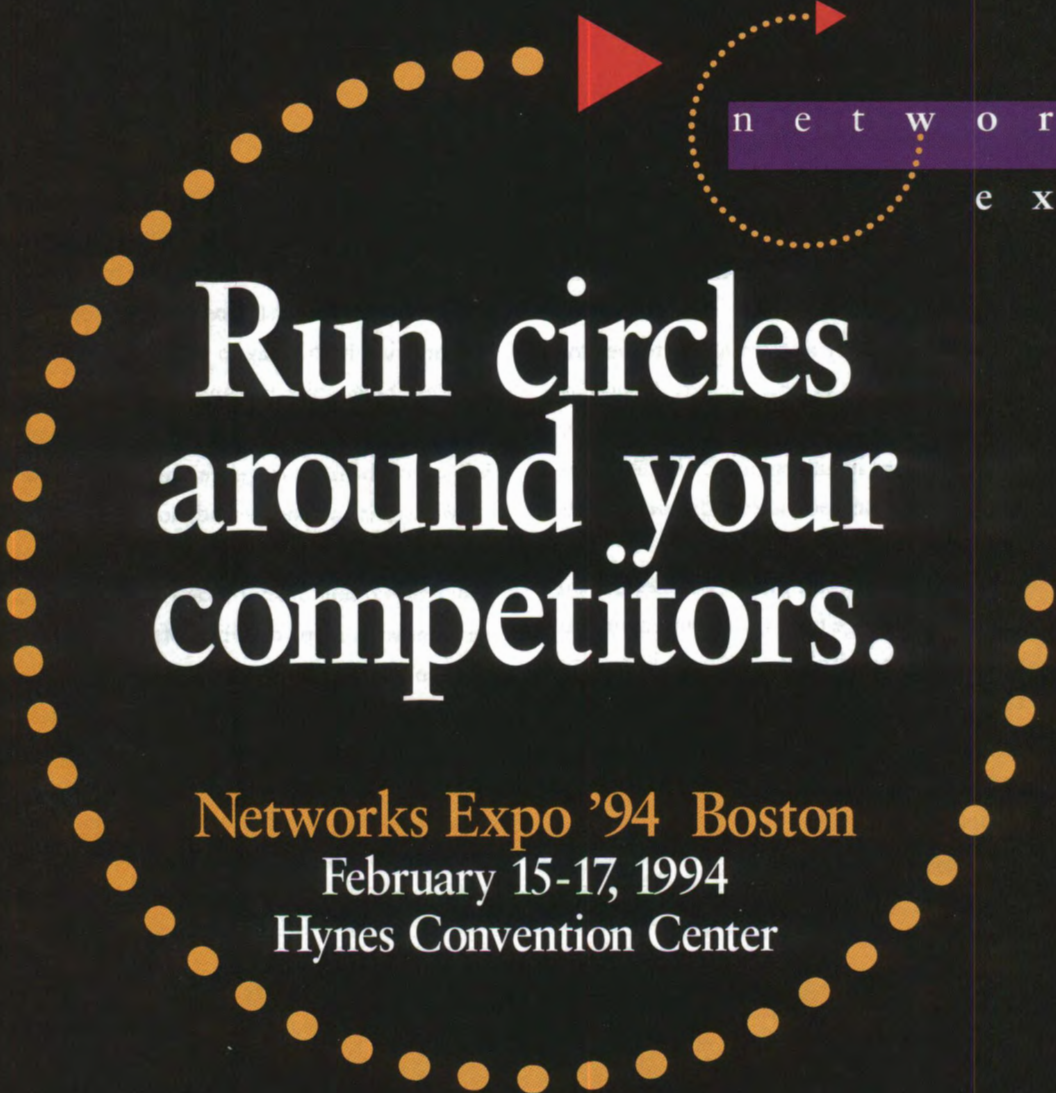


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##### Mexico City, Mexico

Designed for users and professionals in the Mexican and Latin American markets, this event combines three shows: ComExpo for computer users and distribution professionals, ComExpo Telecom for telecommunications professionals, and ComExpo OEM/Maquiladoras for high tech sourcing, manufacturing, and distribution. Comple-

menting the exhibitions will be a comprehensive conference program with tracks covering topics such as basic business applications, desktop utilities and tools, and LAN topologies. The keynote address will be delivered by Philippe Kahn, founder and CEO of Borland International. The event costs \$150 per day or \$300 for all three days. Contact: The Interface Group, Inc., (617) 449-6600 or Reed Exhibition Companies, (203) 964-0000.

### MARCH 10-11

#### HOW TO PROVIDE EFFECTIVE USER SUPPORT

##### Dallas, TX

This seminar is designed for information center technical support and help desk personnel interested in developing the skills and tools they need to provide effective user support. George Spalding, a certified Novell engineer and certified Novell instructor, will lead the seminar, focusing on the interpersonal side of technical support. The price of the two-day workshop is \$695. Contact: Ziff Institute, (800) 348-7246.

### MARCH 14-18

#### MANAGING SOFTWARE AND DEVELOPMENT, SOFTWARE DEVELOPMENT '94, AND BUSINESS SOFTWARE SOLUTIONS

##### San Jose, CA

The first of the three conferences, Managing Software and Development, is scheduled for March 14 and 15. This seminar is designed for managers of software development and integration. More than 40 classes will be offered in five subject tracks: Retooling IS and Business, Management and Organizational Issues, Methods and Tools, People and Productivity, and Quality and Process Improvement. Attendance costs \$395 for one day and \$795 for two.

Software Development '94 and Business Software Solutions will be held concurrently March 16-18. The more than 130 software development lectures and seminars will include topics such as OS/2 Development, Unix, and Object-Oriented Programming. Business Software Solutions is designed for IS professionals looking for client/server-based solutions. Five separate conference tracks are planned with more than 50 courses addressing topics ranging from Constructing the Framework for Client/Server Success to Closing the Gap between IS and Users.

The three conferences will be held at the San Jose Convention Center. The price of a five-day pass to all three programs is \$1,195; three-day attendance costs \$895; two days cost \$795; one day of classes costs \$395. Admission to the exhibition floor alone is \$50. Contact: Software Development and Business Software Solutions Conference Groups, (800) 441-8826.

### APRIL 25-29

#### IBM PERSONAL SOFTWARE PRODUCTS INTERCHANGE

##### San Francisco, CA

This interchange, which focuses on OS/2, is designed for software designers, independent and corporate developers, technical coordinators, LAN experts, MIS managers, consultants, and training executives. Co-sponsored by Computer Associates and Lotus, the Interchange will offer more than 100 elective tracks on topics including OS/2, pen, databases, and LAN systems, as well as Device Driver tracks that previously were covered only in the Device Driver Conference. A new track will help independent software publishers to position, launch, and sustain their products in a competitive marketplace. A "Meet the Editors" session is planned to help small vendors get their products reviewed. The Interchange will be held at the San Francisco Hilton and Towers; registration is \$795 for the full conference until March 21 and \$895 thereafter. Three-day attendance costs \$760, two-day attendance is \$580, and one-day attendance is \$315. An exhibits-only pass is \$200. Contact: IBM Conference Center, (800) 872-7109. ♦





THE VIEW FROM CHAOS MANOR

# Here in Microland

BY JERRY POURNELLE

**W**e know OS/2 is technically superior, the 32-bit operating system with preemptive multitasking that truly implements objects and object-oriented programming, and it's all just wonderful. So why is it I often feel like I'm playing the Adventure Game for high stakes?

Recently I downloaded a bunch of OS/2 files from various bulletin boards. Now true enough, when you collect shareware you take your chances—but I have found it's much more of an adventure in OS/2 than in Windows.

Take a trivial example. The other night I found an OS/2 version of Freecell. Freecell is a solitaire game I first encountered in one of the Microsoft Windows game packs. It runs nicely in WIN-OS/2, so there was nothing vital, but I wanted to see how well the OS/2 version ran. Installation was simple enough. I'd downloaded it in a DOS window on a DOS partition of the disk, so I unzipped it there, then gathered all the parts into a directory on the OS/2 partition and ran INSTALL in an OS/2 window. Everything was fine. True, I didn't have a fancy icon, but I can convert one. OS/2 can't just use the Windows icon, of course; that would be far too simple. But leave that.

Install the program. Now try to run it. **UNABLE TO FIND RlzRun20.RTS**, OK? Well, it's not OK, but there's nothing to do but pretend it is and click, or I'll be staring at that message until Doomsday. Now what is RlzRun20.RTS? Do I have it anywhere? Let's try to FIND it.

Have you ever tried to use the FIND utility? That's another adventure. There's a button to search "all folders," which you might think would mean that it's going to search all the directories on that logical disk. It doesn't, though. It searches only those subordinate to the directory you're in, which by default is the desktop folder. If you want to look at *all* the folders, you have to man-

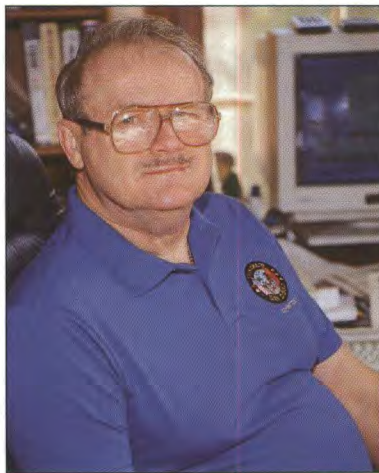
ually change things, and to do that you have to use the keyboard because it doesn't appear that there's a way to do it with the mouse.

It turns out that's not true: if you play around a while you'll eventually figure out that if you go down the "locate" trail you will get to something intuitive. On the other hand, to get there you must have faith that IBM has provided you with a GUI-based way to do what you want to do—and that's a leap of faith not always justified.

All this is sort of explained in the system documents, although it's written in the typical "Clear only if previously understood" lan-

guage that IBM writers know so well. Unfortunately it's not in Dvorak's book, *Dvorak's Guide to OS/2 Version 2.1* (or if it is, it's not indexed properly); and since the IBM documents routinely leave out important things like CHKDSK (index reference to page 93, total entry: "The CHKDSK program analyzes and fixes disk problems caused by improper shutdown."), they aren't the first place I look to begin with. Instead I keep *Voodoo OS/2*, Dvorak's book, and a random selection of the latest review copies in hopes that *one* of them will help. Sometimes that works.

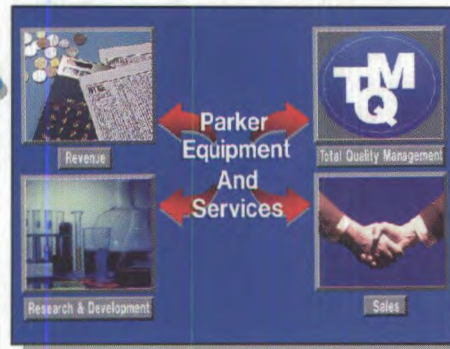
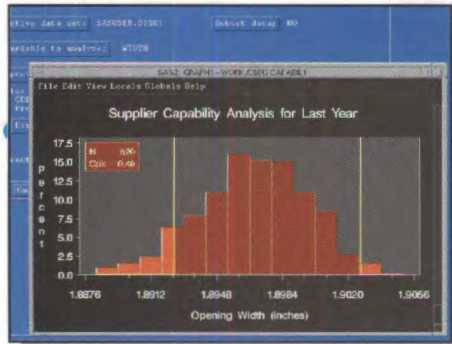
Big corporate sites don't have my problem, and anyway their users can call the IS manager for help. But if IBM really wants OS/2 to catch on out here in Microland, it has some work to do. Making the interface consistent is not quite as important as getting OS/2 for Windows to work with Windows for Work Groups 3.11, but it's not trivial either. Even those who dislike GUIs can get used to one, but not if it's sometimes GUI, sometimes command line, and sometimes resembles the Adventure Game. It's fun discovering that the rod scares the bird, but I'm darned if I want to learn that while trying to install a new program. ♦



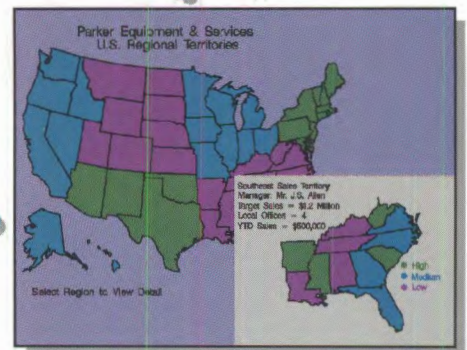


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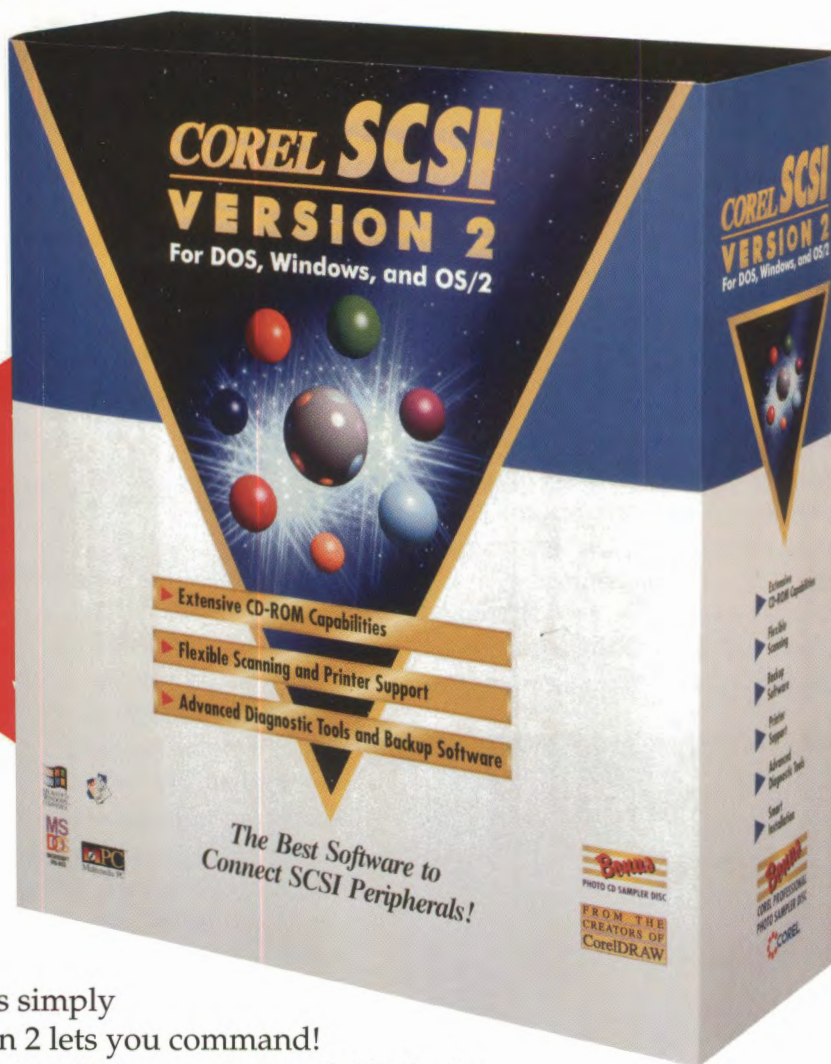


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